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The Role of Product Design, Manufacturing Systems and Environmental Uncertainty in the Nigerian Manufacturing Organizations.

A thesis submitted by

Umar Musa Mustapha

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Abstract

The concept of globalization and technological advancements has created many opportunities as well as threats in the manufacturing sector locally and globally. African countries manufacturing sectors performance are significantly low if compared with the manufacturing sectors of other countries, which is continually linked to multiple internal and external factors. Many research studies were conducted to identify the reasons behind Nigeria's insignificant manufacturing sector economic contribution but very few have adequately addressed the issue at both enterprise and government levels in terms of some specific manufacturing concepts and systems. Hence, this research attempts at identifying barriers to manufacturing performance over the past 25 years in Nigeria, in terms of three selected manufacturing concepts and systems measures - product design; manufacturing systems made up of manufacturing process, strategy and innovation; and environmental uncertainty. Further more, the thesis made a comparative study of Nigerian manufacturing sector with those of China, India and Malaysia, with a view to identifying barriers that are specific to Nigeria's manufacturing sector which hinder its growth and contribution towards the country's economic development.

To accomplish the thesis objectives, the research is focused on answering the central question – to what extent does product design, manufacturing systems and environmental uncertainty impact the performance of Nigerian manufacturing organizations. For this purpose, primary and secondary researches were conducted using mixed methodological approaches that are both quantitative and qualitative in nature. Three–step research process was applied and it is made up of questionnaire survey of 254 manufacturing establishments that employee 50 people and above and has been in existence for at least five years; secondary data analysis which also includes comparative study of Nigerian manufacturing sector with those of China, India and Malaysia; and focus group interview with 10 manufacturing experts.

The research results revealed that the performance of the Nigerian manufacturing sector is significantly low owing to uncertainty in the operating environment. Lack of funds, inadequate infrastructure, less government patronage, non-adaptability to technological advancements, ineffective manufacturing strategy and innovation were also identified as key factors impeding

the sector's growth. The results also revealed huge differences in the performance of the Nigerian manufacturing sector vis-à-vis China, India and Malaysia. The research then made sets of recommendations which include that the Nigerian government should encourage manufacturing investors, develop basic industries, improve infrastructure and implement favourable policies to create a better operating environment. Also it was recommended that manufacturing firms should encourage more research and development, innovations and strategy practices, skills acquisitions from other foreign firms, among other sets of recommendations. It was also suggested that Nigeria should learn more from the patterns of China, India and Malaysia manufacturing sectors with the hope of developing effective and productive manufacturing sector.

Key words: Product design, manufacturing process, innovation, strategy, environmental uncertainty, Africa, Nigeria, China, India and Malaysia

Thesis Contribution to Knowledge

The thesis is aimed at examining the performance of the Nigerian manufacturing sector in terms of Product Design, Manufacturing Systems – Manufacturing Process, Manufacturing Strategy and Manufacturing Innovation - and Environmental Uncertainty. The research is also focused on comparing the performance of Nigerian manufacturing sector with some developing countries such as China, India and Malaysia, in terms of the selected performance measures. The research was conducted with help of a mixed methodological approach which comprised of a secondary analysis of data, statistical survey with 254 manufacturing firms in Nigeria and a focus group interview with 10 experts. Below are the thesis major contributions to new knowledge.

1. The data analysis revealed that inadequate supply of raw materials and energy resources, lack of infrastructural facilities, financial resources, government patronage and skilled workforce, high level of corruption and low salaries and incentives are the major factors impeding the growth and development of Nigerian manufacturing sector. The findings of the statistical survey and the focus group interview had little contradictions with the secondary analysis and agreed that the above mentioned factors are the main limitations faced by the Nigerian manufacturing sector.

2. The research presented an in-depth analysis of the performance of Nigerian manufacturing sector in terms of the selected manufacturing concepts which are used as performance measures, these concepts are product design, manufacturing process, manufacturing strategy and manufacturing innovation. It was found that not much study on these concepts when grouped together has been done. The outcome of the study revealed that the current level of product design, manufacturing process and innovation are low in Nigeria mainly due to non-adaptability to advancements in technology.

3. The results also show that manufacturers in Nigeria need to focus on updating technology which will help them in coming up with innovative ideas in creating new product designs. Again they need to introduce modern tools and techniques within their manufacturing process to compete at the international level. The work also suggested the need for restructuring and reforming the current strategies to capture the attention of new consumers and successfully retain the loyalty of their existing consumers.

4. The results of the research revealed that there is huge gap between the performance of Nigerian manufacturing sector and those of China, India and Malaysia, specifically in terms of the selected performance measures, which was also found missing in the literature. The results revealed that social and economic stability in China, India and Malaysia play an important role in the performance of the manufacturing sectors of these countries which helps them in contributing towards the economic development. China focuses on manufacturing products with innovative and advanced features, with shorter lifecycles and at low prices which has enabled the country to hold a major share in the global manufacturing industry. Adapting to new techniques and modern technology and favourable regulatory reforms were the main factors for improvement in the Indian manufacturing sector. The Malaysian government had allocated high capital and resources to promote the heavy industries which resulted in the economic stability of the country.

5. The study suggested that the Nigerian government should focus on developing the basic infrastructural facilities, encourage foreign investors and implement favourable policies to provide a suitable environment for improving the performance of the Nigerian manufacturing sector. The results also suggested that Nigerian manufacturers should focus on adapting to new technology, improving the skills of the workforce and invest on research and development to become competent in domestic and international market.

6. The mixed methodology selected for conducting this research was rewarding and in summary, the research provided an in depth knowledge about the selected measures and its importance in the success of the manufacturing industry. The research helped in understanding the performance of the manufacturing sectors of Nigeria as well as that of developing countries like China, India and Malaysia. The research also helped in providing the necessary suggestions and recommendation in improving the performance of the Nigerian manufacturing sector. The proposed measures require sufficient financial resources that the sector currently lacks, which calls for further research in identifying different methods of improving the manufacturing sector with the available finances.

Associated Publications

1. Mustapha U. M., Ku H. and Goh S (2010); Literature review of past and present performance of the Nigerian manufacturing sector. *Proceedings of the IMechE, Part B: Journal of Engineering Manufacture.* DOI 10.1243/09544054JEM1818. Online ISSN 2041-2975.

2. Mustapha U. M., Ku H. and Goh S (2009); *Research Design for Investigation of Nigeria Manufacturing Management.* Rough Sets and Knowledge Technology, 4th International Conference, RSKT 2009, Gold Coast, Australia, July 14-16, 2009. Proceedings. Lecture Notes in Computer Science 5589 Springer 2009, ISBN 978-3-642-02961-5.

3. Mustapha U. M., Ku H. and Goh S (2010). The Importance of Product Design in Nigerian Manufacturing Sector. *Competition and Challenge: The journal of global political economy.* Paper under review.

4. Mustapha U. M., Ku H. and Goh S (2010). Are African manufacturing enterprises competitive in terms of manufacturing process? *International Journal of Production Research.* Paper under review.

5. Mustapha U. M., Ku H. and Goh S. (2010). Impacts of Manufacturing Strategy and Innovation in Nigerian Manufacturing Success. Paper has been sent to Proceedings of the Institution of Mechanical Engineers, Part B, *Journal of Engineering Manufacture*. Paper under review.

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7. Mustapha U. M., Ku H. and Goh S (2010). Decline of Manufacturing in Africa: China and India responsible? Or who else. *International Journal of Advanced Manufacturing Technology.* Paper under review.

Certification of Thesis

I certify that the ideas, designs and experimental work, results, analyses and conclusions set out in this thesis are entirely my own effort, except where otherwise indicated and acknowledged.

I further certify that the work is original and has not been previously submitted for assessment in any other course or institution, except where specifically stated.

Umar Musa Mustapha
W0103545

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Signature of Candidate

ENDORSEMENT

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Signature of Principal Supervisor

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Signature of Second Supervisor

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Umar Musa Mustapha

University of Southern Queensland

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Table Of Contents

CHAPTER 1

INTRODUCTION

CHAPTER 2

LITERATURE REVIEW OF MANUFACTURING AND MEASURES OF MANUFACTURING PERFORMANCE

CHAPTER 3

LITERATURE REVIEW OF THE NIGERIAN MANUFACTURING SECTOR

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

APPENDICES **PAGE**

List of Tables

List of Figures

List of Graphs

Acronyms and Abbreviations

ADB	African Development Bank
BPR	Business Process Reengineering
CAD	Computer Aided Design
CAM	Computer-Aided Manufacturing
CBN	Central Bank Nigeria
CEO	Chief Executive Officer
CIM	Computer Integrated Manufacturing
CNC	Computer Numerical Control
CP	Capital Productivity
CPG	Consumer Packaged Goods
EIA	Energy Information Administration
FDI	Foreign Direct Investment
FICCI	Federation of Indian Chambers of Commerce and Industry
FMCG	Fast Moving Consumer Goods
FMS	Flexible Manufacturing Systems
FOF	Factory Of the Future
GDP	Growth Domestic Product
IMF	International Monetary Fund
ISIC	International Standard Industrial Classification
ISO	International Organization for Standardization
JIT	Just-In-Time
MAN	Nigerian Manufacturers Association of Nigerian
MRP	Materials Requirements Planning
NFPEs	Non-Financial Public Enterprises
NGR	Nigeria
NPC	Nigerian Population Commission
OPEC	Organisation of Petroleum Exporting Countries
R&D	Research and Development
SAP	Structural Adjustment Programme

SMEs	Small and Medium Enterprises
TQC	Total Quality Control
TQM	Total Quality Management
UNCTAD	United Nations Conference on Trade and Development.
UNIDO	United Nations Industrial Development Organization (UNIDO),
USA	United States of America
WPR	Wage Productivity Ratio

CHAPTER I

INTRODUCTION

1.1 INTRODUCTION

This chapter gives an overview of the entire research study by explaining the main motive and objectives of the research, conceptual framework and the research approach. In this chapter, the background of the research study is explained to provide an understanding about the topic of the thesis. Moreover, the problem definition and the research focus further explain the purpose of the research study. The significance and the expected contribution of the research study are also described to justify the reason and scope of the research topic. Furthermore, the chapter explained the methodology and major findings of the thesis. In it also, the key concepts and terms are defined to aid understanding of all the related concepts.

1.2 BACKGROUND OF THE PROBLEM

Manufacturing is regarded as one of the most important forces in accelerating the economic growth and development of a country. Experts believe that the significant contribution of the manufacturing sector in the growth of the gross domestic product (GDP) can greatly support a country's economic development (Dipak and Ata, 2003). Advancements in technology and the emerging concept of globalization have introduced many opportunities as well as threats in global and local manufacturing organizations (Sethi et al., 2001). On the one hand, the manufacturing processes have become cost effective and innovative due to the use of advanced machinery and techniques. Also, the highly competitive market and rapidly changing demands of the consumers and the shorter life cycle of products represent great challenges faced by manufacturing organizations of the modern days. Despite all these threats and opportunities, it is a widely accepted fact that the manufacturing sector has the power to boost the economic growth of countries that focus on its development and growth.

Manufacturing all over the world is going through changes due to the advent of new technologies and advancements in communication. Also, the attitude of consumers towards the products has changed significantly and there are different attributes of products, such as design and competitive features that have a greater influence on the consumer decision

making. Therefore, the manufacturing organizations of today are required to emphasise the importance of product design, manufacturing process, manufacturing strategy, and manufacturing innovation and so on.

Since World War II, some countries started focusing on improvement in manufacturing processes for designing of new products (Malik and Baptist, 2004). This action resulted in the invention of many successful products and organizations showed remarkable high profit rates. Organizations that succeeded in introducing more innovative products gained stronger positions both locally and globally. Currently, only organizations that have successfully managed to cope up with the ongoing technological advancements, after making operational changes, are able to use their manufacturing strategy as a supporting tool in the growth of the organization. However, many countries, especially developing ones, are still struggling to bring to forefront the critical importance of manufacturing for their economic growth and until now, their manufacturing organizations have not emerged as a strong and supportive sector.

Many of the African countries have failed to gain a strong position through the efficient performance of their manufacturing organizations because there are several important barriers that hinder their growth which is stopping them from playing a supportive role in their economic development. Specifically, looking at the case of Nigeria, it was found that the country is lagging behind in the significant development of its manufacturing sector (Adeoti, 2002). Nigeria is the most populous country on the African continent and is also the eighth most populous country in the world, with a population of over 140 million people at end of 2007 (NPC, 2007). Though the current conditions for its economic stability and growth are not very positive, the international monetary fund (IMF) has placed the country among the 'Next Eleven' economies (Euromonitor, 2008). The IMF has projected a 9% growth for 2008, whereas for 2009 the estimated growth rate is 8.3 % (CBN, 2008).

Nigeria was among the middle income nations of the world during the 1970s and early 1980s, owing to its oil production and export. However, the world oil market collapse in early 1980s resulted in major negative impacts on the economic performance and development of the country and by 1999 it fell into the list of the world's 30 poorest nations (Anyanwu, 2000). Nigerian manufacturing sector continues to play an important role through job creation, although contribution to the overall economic growth and development of the country is not significant enough. In 2007, the formal Nigerian

manufacturing sector represented 15% of the total formal employment in the country. Currently, 36% of private sector employments in the country come from the manufacturing sector.

The Nigerian manufacturing sector's share was less than 5% of the GDP in 2005 and experts believe that in order to secure sustainable economic growth, there must be significant rise in its contribution (Adeolu, 2007). The manufacturing sector's contribution to the total GDP in Nigeria is very low compared with other developing countries. For example, in 2003 there was just a 4% share of manufacturing sector, whereas in China, India and Malaysia their share had reached 34%, 25% and 30%, respectively (Asian Economic Bulletin, 2004). The GDP share in these countries is regarded as significant and supportive but unfortunately the Nigerian economy lacks this level of support from the manufacturing industry.

The unimpressive economic contribution of the manufacturing organizations in Nigeria is attributed to the fact that the organizations are experiencing a slow growth rate due to a set of internal and external barriers. These include a lack of basic applications of some manufacturing concepts and performance indicators as suggested by Mazumdar and Mazaheri (2003). This led Adeoti (2002) to conclude that there are certain factors such as lack of basic infrastructure, government policy changes, technology and others that have contributed towards the present manufacturing organizations' condition.

There have been many research studies (Kingsley and Nezianya, 1999; Tunde, 1999; Neil et al., 2002, Mazumdar and Mazaheri, 2003, Deshmukh, 2005) conducted in order to identify the main reasons behind the economic instability in Nigeria. Some of these researches revealed that the low performance levels in the manufacturing sector are negatively affecting the economic development and growth of the country. The researchers proposed different suggestions like manufacturing organizations concentrate on remanufacturing, learning by doing techniques and so on for improvement so that some level of economic stability can be achieved. However, it is observed that few studies have directly focused on manufacturing concepts like product design, manufacturing systems and environmental uncertainty in Nigeria and there are few facts and figures provided that analyse the Nigerian manufacturing organizations and highlight their main predicaments. In this regard, it is very important that the main factors behind the decimal performance of manufacturing organizations in Nigeria are fully identified and improvement methods and policies are

recommended so that organizations can play their expected roles to improve the country's economy.

1.3 MOTIVATION FOR THE RESEARCH

This researcher, as a manufacturing worker with 25 years work experience, obtained within the African manufacturing establishments is convinced that there are a lot of challenges that have seriously impacted on African manufacturing process, strategy, innovation and products design, which in turn affects Africa's manufacturing survival, growth and development. Some of these challenges are known but have not been adequately addressed while others appeared to be less well known and are largely unattended by researchers. These may not be unconnected with difficulties in doing research in Africa.

Therefore, the researcher's motivation is based on the need of bringing some positive suggestions for change in the Nigerian manufacturing sector. It is observed that Nigerian manufacturing sector performance is very low due to an array of factors which include, among others, challenges in manufacturing process, strategy and innovation, and environmental uncertainty. In order to make the sector actively participate in the economic development of Nigeria, it is necessary that all barriers related to product design, manufacture, strategy, innovation and so on are fully analysed and possible solutions provided.

There has been a number of research studies conducted that focused on the issues and problems associated with the Nigerian manufacturing sector (Malik and Baptist, 2004; Mazumdar and Mazaheri, 2003; Obi, 1999). These studies have also highlighted the important factors that play a role in the slow pace of growth of the Nigerian economy. In continuation to these studies, this thesis is based on identifying the main factors responsible for this slow growth rate so that efforts can be made to remove those barriers, or at least to minimize their negative effect. The main purpose of the entire work is to suggest improvement to the Nigerian manufacturing sector so that the economy of the country can enjoy the effects of such improvement.

1.4 RESEARCH FOCUS

The main focus of the proposed research is to analyse and evaluate the manufacturing organizations in Nigeria with respect to developments in manufacturing process, manufacturing strategy, manufacturing innovation, product design and environmental

uncertainty over a 25 year time period (1985-2009). The research also presents a comparative literature analysis of the Nigerian manufacturing sector with that of three selected countries, namely: China, India and Malaysia. The outcome was then used to put forward some suggestions that can bring some improvements in the manufacturing sector of the country. In this regard, the objectives of the research are as follows:

- To understand the importance of product design, manufacturing processes, manufacturing strategy, manufacturing innovations and environmental uncertainty that are used as variables for assessing the Nigerian manufacturing establishments.
- To evaluate the Nigerian manufacturing sector over 25 years (1985-2009).
- To trace the major developments that occurred in the Nigerian manufacturing sector with respect to manufacturing process, manufacturing strategy, manufacturing innovation, product design and environmental uncertainty.
- To identify the main barriers that hinders the significant growth of the Nigerian manufacturing sector and its contribution to the economic development of Nigeria.
- To compare the literature of manufacturing sector of Nigeria with that of three selected countries (China, India and Malaysia)
- To suggest some strategies and plans that could work for the improvement of the Nigerian manufacturing sector which could also lead the country towards the path of greater economic growth and development.

1.5 CONCEPTUAL FRAMEWORK

The history of manufacturing is centuries old and it has taken its current shape after going through several developments and stages. Modern manufacturing has emerged from the end of twentieth century and has witnessed exponential growth and advancements in the recent past. The diversification strategies have helped the manufacturing industry to realize importance of high quality products at low cost with high level of flexibility. The manufacturing process saw many revolutionary changes during the 1980s with the development of management philosophies and technologies. The introduction of new concepts and philosophies started having significant impact on the performance and activities of the manufacturing industry. 1990s saw the realization of the manufacturing sector on the importance of quality management. The industry saw the creation of awards for quality management and also certain quality standards were set with the beginning of International Standardization Organization (ISO certification), across the globe.

Increasing competition and globalization lead to innovations in the sector and also witnessed introduction of several other concepts and paving way for outsourcing and mass customization. Priorities were set to focus on cost, quality, reliability, delivery, flexibility and speed in introducing new products. By the end of twentieth century, there was great need for quality in products as well as process and manufacturers were required to make best use of available resources. Consumers' awareness increased with the advent of internet and manufacturers were required to develop superior products at low prices with timely delivery. Thus, the above analysis of manufacturing at the global level highlighted only the historical perspective of manufacturing and not the challenges faced currently by the manufacturing sector with the advancements in technology. This thesis is set to fill this gap which is further explained in the literature review chapter.

Advancements in technology provide great opportunities but at the same time are very challenges for the manufacturing sector. With the introduction of new tools and techniques manufacturers are able to produce cost effective and high quality products which are competitive in the domestic and international markets. The rapid improvement in technology reduced the manual task and hence the workforce. Access to raw materials became convenient with trade liberalization and faster transportation. With the capacity to influence the economic development of country, the Nigerian manufacturing sector is required to have awareness in choosing the appropriate technology for cost effective and quality production. Many researches conducted to evaluate the impact of technology in the manufacturing sector revealed that the performance of the sector is to be positively influenced by technology. Many researches on the analyses of the impact of technology in the manufacturing sector highlighted the importance of improved technology but failed to ascertain how developing countries can cope with these advancements. The current research attempts to fill this gap by explaining how to draw benefits from technological advancements in the Nigerian manufacturing sector.

Nigeria has been an oil dependent country and the global oil crisis has affected its economy considerably, because the government failed to successfully focus on other sectors. Factors such as insecurity, political instability, market distortion, monopolies, weak infrastructure and unavailability of finance were identified by many researches (Adeolu, 2007) which affected the growth and development of the Nigerian manufacturing sector and the economy as a whole. Many researches were conducted to understand the present situation

of the manufacturing sector which revealed factors such as adverse economic conditions, shortage of capital, high interest rates and bank charges, consumers' preference to foreign goods, high minimum wages, unstable and unfavourable government, regulations and policies, inadequate and poor infrastructure, political instability, heavy competition from multinationals and inadequate adoption of new technologies (Frazer, 2005). Further researches revealed that there is great need for reforming such private sector friendly policies, better capital utilization, improvement of power sector, improvement in infrastructure including the railways, roads and other communication systems (Koren, 2010). However, despite all these studies, Nigerian manufacturing sector has continue to decline, thus there is the need to further explore and explain possible reasons for the continuous decline. This thesis attempts to do that.

To analyze the performance of the Nigerian manufacturing sector, specific measures of performance are to be identified. Hence, product design, manufacturing systems (manufacturing process, manufacturing strategy and manufacturing innovation) and environmental uncertainty were selected for review. Product design is a key factor in the process of manufacturing as it sets the core characteristics, features and performance level of a product or service based on consumers' demand. Manufacturing companies need to research and conceive the idea, come up with an innovative design for the product with updated technology and successfully manufacture it to meet the rapidly changing needs of the consumers and also try to remain competitive in the market. A product goes through various phases from the time the idea is conceived about the product till it takes the form of a finished product. Broadly, manufacturing process consists of planning, implementing and controlling phases and the manufacturer needs to adopt the right policies and strategies necessary throughout the process. In this highly competitive market, the process does not end with the finished product as the process continues in improvising the product based on the consumers' changing demands. Hence, manufacturers need to understand the significance of manufacturing process which determines their success.

Manufacturing strategy is an important business activity which leads to productivity and efficient performance. It decides as to how well to operate and arrange the resources to meet the manufacturing objectives. Manufacturing strategy is a set of policies revolving around plant and equipment, production planning and control, labour and staffing, product design and engineering and organization and management. Innovation is a critical factor in

the manufacturing sector, which is a continuous process to become competitive in the market. Innovation has an important role to play in conceiving the idea of a new product, designing the product, defining the process, formulating the strategy and adapting to the technology. Innovation not only helps the growth and development of the manufacturing sector but also plays a vital role in the economic stability of a country. Environmental uncertainty is referred as the political, economical, social, technological and legal environment that affects growth and development of the manufacturing sector. Uncertainty in the operating environment affects several strategic operations and planning of the sector. The stability and certainty in the environment helps the manufacturing companies to be competitive and also survive even in challenging situations. The other performance measures such as the product design, manufacturing process, manufacturing strategy and manufacturing innovation are affected if there is uncertainty in the operating environment. The current research attempts to make a detailed performance study of the Nigerian manufacturing sector in terms of the identified variables, namely; product design, manufacturing systems (manufacturing process, manufacturing strategy and manufacturing innovation) and environmental uncertainty.

Comparing Nigerian manufacturing sector with those of China, India and Malaysia, It is observed that Chinese manufacturing sector is progressing well by manufacturing goods at low prices with shorter life cycles, thus holding a major share in the global manufacturing. Chinese manufacturers also consider standard and quality of the product seriously hence they adopt and utilize the latest techniques of manufacturing faster. The Chinese government also opened up the country to international manufacturers and foreign investors which lead to increased Foreign Direct Investment (FDI) and witnessed an improvement in various other economic fields (Adeolu, 2007). However, the rise in world oil prices have had an impact on the performance of Chinese manufacturing sector due to increase in manufacturing cost, rise in price for diesel and energy resources, rise in transportation cost and availability of skilled and qualified labour.

The manufacturing sector in India has contributed significantly towards the economic prosperity of the country. The researches revealed that the significant performance of Indian manufacturing sector is driven by good investment in research and development work and the level of technology uptake (Koren, 2010). Considerable share of private sector and high rate of employment in manufacturing has contributed to the performance of the sector.

However, the Indian manufacturing sector is modest in size when compared to other developing countries like China and Malaysia. The contribution from the manufacturing sector towards GDP is very low when compared to some East Asian countries and there is need for implementing reforms (Marques and Puig, 2010). There is need for the sector to be supported by adequate investment to be competitive at international level and necessary for the government to formulate policies and plans for increasing the growth rate of the manufacturing sector (Frazer, 2005). There is great room in Indian manufacturing sector for innovating different ideas and concepts in manufacturing of low cost high quality products and services.

With tough competition from China and South Asian countries, the Malaysian manufacturing sector needs major reforms to compete with neighbouring countries and in the international market. The Malaysian government has implemented different economic reforms along with liberalization and hence the manufacturing industry has few restrictions and trade barriers. Currently, the great challenge for manufacturers in Malaysia is to be technology and knowledge driven. There is necessity for an increase in research and development expenditure to enable the manufacturing of new products which are cost effective and attractive (Koren, 2010). However, it was also revealed that high capital and resources allocated to the heavy industries brought improvement in the situation and economic stability for the country (Adeolu, 2007). The business environment is regarded as over regulated and there is need for focus in research development work and increase skilled workforce. Therefore, a comparative study of Nigerian manufacturing sector with those of China, India and Malaysia may help in discovering new learning points for the Nigerian manufacturing organizations and also for the Nigerian governments for the purpose of improving the current situation, thus this research attempts to accomplish this point.

1.5.1 Research Questions

In order to accomplish the objectives of the thesis and based on the conceptual framework set out above, the following central research question is answered: “To what extent does product design, manufacturing systems and environmental uncertainty impacts on the performance of the Nigerian manufacturing organizations?”. And also in order to answer the central research question, the following sub-questions are answered:

1. *What was the performance of the Nigerian manufacturing sector from 1985-2009 in terms of product design, manufacturing processes, manufacturing strategy, manufacturing innovations and environmental uncertainty?*

2. *What are the main problems and limitations faced by Nigerian manufacturing organizations?*
3. *What are the factors that have played an important role in undermining manufacturing sector growth in Nigeria?*
4. *What are the main differences in terms of product design, manufacturing processes, manufacturing strategy and manufacturing innovations in the Nigerian manufacturing sector as compared with that of other countries like China, India and Malaysia?*
5. *What are the strategies and policies that can help Nigeria to cope with the technological advancements in manufacturing?*
6. *What strategies and planning can improve the performance and productivity of the Nigerian manufacturing organizations?*

1.6 RESEARCH METHODOLOGY

There are three important issues in formulating research design and methodology (Creswell, 2003). Firstly, the researcher has to decide what would be the purpose of the research, secondly, what would be the process of conducting the research and thirdly, what would be the outcome of the research. When deciding the purpose of a research, types of researches must be understood very clearly so that it can be explained which research type will be most suitable for the research purpose. There are basically four types of research purposes including "exploratory, descriptive, explanatory and predictive" (Johnson and Onwuegbuzie 2004, p27). This research is both exploratory and explanatory. It is exploratory because the researcher generally looks for ideas and patterns to gain insight and deep familiarity with the subject matter. Based on the conceptual framework, it is found that this research work is exploratory in nature as it explores various macro manufacturing concepts that have not been fully unfolded in the previous studies.

This research is also an explanatory type of research. Mostly, explanatory research is based on empirical studies and tested hypotheses that are formulated by researchers in order to find out the solution to their problem statement (Saunders et al., 2007). Explanatory research enables the researcher to generally go for description of the characteristics and analysis and explanation of the entire situation to find the reasons behind any incident. This type of research strives to understand and explain the phenomena by discovering and measuring the casual relationship between different factors. From these arguments, this research is also an explanatory as it is aimed at explaining different manufacturing concepts in details. Moreover, the thesis is also attempt to find out the main reasons behind the

decimal performance of the Nigerian manufacturing establishments. This further confirms that it is an explanatory research.

The research study employs a mixed methodological research approach. This has been chosen because it is a significant method for conducting different types of research studies. Johnson and Onwuegbuzie (2004, p27) explained that mixed-method research draws upon the strengths of both quantitative and qualitative analysis, which enable the researcher to consider several methodologies in measuring the variables in the study. In this way the research uses a combination of methods that are both qualitative and quantitative in nature. The research attempted to apply a three-step research methodology comprising of questionnaire survey of 400 manufacturing establishments, secondary data analysis and focus group interview with 10 manufacturing experts.

1.6.1 Questionnaire Survey

Questionnaire survey is the first step of the research strategy and it is in the form of a quantitative research which is an empirical study that investigates the role of product design, manufacturing processes, manufacturing strategy, manufacturing innovations and environmental uncertainty in the Nigerian manufacturing establishments. In the light of the literature review, the study specifically addresses relevant issues to determine the demands and expectations of the consumers. These include motivations for manufacturing creation, managements' skills and technical capabilities, potential to generate unique and competitive ideas and concepts for products, performance of the Nigerian manufacturing organizations in terms of productivity and revenues, quality of the products and adequate research among other issues. The study also includes analysis of manufacturing executives' education, employment history and experience, problems encountered in operating the manufacturing enterprises, training and advice received from manufacturing experts, and their aims, objectives and future expectations for the future of their manufacturing businesses. Data relating to the performance of the manufacturing establishments is obtained from a detailed survey questionnaire together with basic business data such as type of products manufactured, employment history, period of manufacturing and capital employed.

In conducting the primary survey, a statistical survey among 400 manufacturing establishments was conducted to find more information and data related to the topic. A fairly large sample was chosen in order to have wider information related to the topic because of the diversified nature of manufacturing organizations in Nigeria. Statistical survey

was one of the most important and preferred methods of conducting this research. As explained by Creswell (2003), a statistical survey is an efficient way of collecting information from a large number of respondents. The gathered information can be used to study attitudes, concepts, values, beliefs, and behaviours. Massey et al. (1997) explained that a survey is an effective and efficient method of collecting data from large number of respondents enabling a large sample size. The data can be used to determine validity, reliability, and statistical significance. Surveys are also considered as flexible research methods because they are standardized and easy to administer (Creswell, 2003). Keeping in view the significance of surveys and the requirements of the research study, this research tools is selected and quantitative data is gathered by conducting a survey.

The survey is conducted using a structured questionnaire. The questionnaire is constructed using the Likert scale as well as traditional open ended questions (Likert, 1932). Some of the questions are kept open ended in order to obtain detailed answers related to the topic whereas most of the questions constructed using the Likert scale are bipolar in order to measure either positive or negative responses to a statement (Likert, 1932). It is a common system used in surveys. By following the Likert Scale the respondents are asked to indicate their degree of agreement with the statement or any kind of subjective or objective evaluation of it. Traditionally a five-point scale is used. For this study the five point scale system is also used and the respondents are asked to express their opinions about the given statement by picking the answer from the given five options.

The following procedure was followed in selecting the 400 organizations used as survey sample for the research study. First of all the country was divided into three zones: Lagos and West Nigeria, East Nigeria and North Nigeria. Then the list of the 400 manufacturing organizations was drawn from the Directorate of Nigerian Manufacturers Association of Nigerian (MAN). Different types of manufacturing organizations were involved; such organizations included firms in the food, pharmaceuticals, healthcare, automotive, chemical and petrochemicals industries.

The directorate of MAN offered the names of some over 2,000 established organizations and from the list, 400 organizations were selected on the basis that there must be more then 50 employees working at the selected company and it must have been operating in the field for more than five years, so the selected organizations must have been established before 2002. The organizations falling under these criteria were selected for the survey and the final list of

400 organizations was drawn up. Introductory letters were sent to the CEOs and the head of the manufacturing departments of the selected organizations so that the respondents were persons that had a certain degree of authority to take the final decisions in their organization as these people were in a better position to provide answers to the survey questions. In this way the survey sample was selected for the statistical survey.

Grooves (1989) explained that there could be different methods of collecting information from the survey. These methods of conducting surveys include "mail, electronic email, face-to-face, telephonic interviews, online surveys and survey in person. Researcher can choose from these methods according to the sample and based on the research requirement. For this statistical survey, face-to-face administration method was used. When a statistical survey was administered by the researchers, it was called a "researcher administered survey" (Grooves, 1989). This statistical survey was also administered by the researcher with the help of three hired research assistants that administered the face-to-face questionnaire. However, some of the respondents were also accessed through telephones and emails. The respondents were also assured about the confidentiality of the information they provided in the survey questionnaire and the details of the respondents were not mentioned in the research reports in order to have some degree of anonymity of the respondents.

1.6.2 Secondary Data Analysis

The second-step of the research is a secondary data analysis in form of qualitative research. Qualitative research could be of several types, as identified by Berg (1989). There are many ways of conducting a qualitative research including "case study, literature review, natural experiment, participant observation, interviews based, and secondary analysis of data or combination of these Berg (1989, p36)". Each of these strategies has its own advantages and disadvantages depending on the following conditions:

1. Type of research questions;
2. The investigator's control over the actual behavioural events and ;
3. Degree of focus on contemporary events.

Thus, secondary data analysis can be presented in form of a qualitative research. It is a significant method of conducting research as it allows for review and analysis of relevant research and documents. Researchers like Tashakkori et al. (1998); Creswell (2003) agreed upon the significance of the secondary analysis of data as a qualitative research tool.

Saunders et al. (2007) also threw light on the significance of the secondary analysis of data and explained that it is a significant research method used for the description of various analytical practices using the pre-existing data. This could be done, either for the investigation of the new research question, or for the re-evaluation of any of the primary studies for the purpose of collaboration. He further explained that in order to conduct the secondary analysis of data, literature reviews are conducted of the available material in order to describe and appraise the ways in which the researchers have found the answers to the research questions. Therefore, review of relevant literature is helpful in considering the future implications and development of the issues related with the topic of the research. Hence in this regard, secondary data analysis was selected as one of the methodology for the qualitative research of the proposed research work.

1.6.3 Focus Group Interview

The third-step of the proposed research is also a qualitative research in the form focus group interview. The choice of group interviews revolves around the desire to obtain first hand analysis from different individuals within the Nigerian manufacturing establishments. The use of multiple sources of data facilitates the validation of data through triangulation. This helps enrich conclusions and recommendations in this research. In addition, the use of group interviews is known to serve several advantages over individual interviews. According to Creswell (2003), group interviews reveal consensus views, may generate richer responses by allowing participants to challenge one another's views, it may also be used to verify research ideas of data gained through other methods and enhancement of the reliability of responses. It also strengthens the survey and secondary data analysis arguments and again it provides new knowledge in the event that nothing is determined from the questionnaire survey.

Krueger (1988, 18) defined a focus group as a "carefully planned discussion designed to obtain perceptions in a defined area of interest in a permissive, non-threatening environment". Merton et al. (1990, 135) suggested that the focused interview with a group of people "...will yield a more diversified array of responses and afford a more extended basis both for designing systematic research on the situation in hand..." Unstructured, open-ended questions are asked because such questions allow respondents to answer from a variety of dimensions. Questions are carefully selected and phrased in advance in order to elicit maximum responses by all the participants.

The focus group interview was conducted with 10 high profile manufacturing experts' who ere selected from manufacturing establishments, universities, research institutions and manufacturing consultants. This was inline with Stewart and Shamdasani's recommendation that group interviewing should be "...limited to those situations where the assembled group is small enough to permit genuine discussion among all its members" (Stewart and Shamdasani, 1990, 10). Merton et al. (1990, 137) suggested that "the size of the group should manifestly be governed by two considerations...it should not be so large as to be unwieldy or to preclude adequate participation by most members nor should it be so small that it fails to provide substantially greater coverage than that of an interview with one individual".

In the process of conducting the focus group interview, participants were asked to describe in detail their perception of the role of product design, manufacturing processes, manufacturing strategy, manufacturing innovations and environmental uncertainty in the Nigerian manufacturing establishments. How to find such people who not only have time but also are versatile with product design, manufacturing systems and environmental uncertainty was one of the challenges this research encountered. This problem was resolved by finding such people through review of manufacturers' association of Nigeria (MAN) business directorate of who is who, website search of successful Nigerian businesses and intellectuals, attendance of specialized conferences and follow-up of possible links from the survey of the Nigerian manufacturing organizations. Once an expert was identified, the next step was to convince him/her to participate in the focus group interview at a specific date. The focus interview was conducted at an agreed location sponsored by the researcher.

The data collected from the focus group interview was recorded and analyzed. The aim of this analysis was to look for trends and patterns that reappeared within the focus group. Content analysis was employed for comparison of the words used in the answers provided by the participants and the researcher considered emphasis or intensity of the respondents' comments, consistency of comments and the specificity of responses.

1.6.4 Summary of Research Methodology

Overall, the proposed methodology of the thesis involved a three–step strategy, made up of a statistical survey among 400 Nigerian organizations, secondary analysis of data to present qualitative information related to the topic and a qualitative focus group interview with 10 manufacturing experts to validate the findings of the research. For the survey, a structured

questionnaire was used and from the directorate of Manufacturers Associations of Nigeria (MAN), 400 organizations were selected and their chief executive officers (CEOs) were requested to take part in the survey. Along with the CEOs, the head of operations in large manufacturing organizations, products designers and process and quality control managers were also contacted so that the views of different people related with the industry are gathered. For the secondary data analysis, different journals, research reports, magazines, books, electronic journals and web portals were accessed and information gathered from these sources in order to conduct the analysis of the available secondary data.

Finally, for the focus group interview, manufacturing experts from reputable manufacturing organizations, academics, research institutions, consultants were selected and interviews at a venue provided by the research.

1.7 MAIN RESEARCH FINDINGS

To review the impact of product design, manufacturing systems and environmental uncertainty on the performance of the Nigerian manufacturing organizations for the last 25 years, a mixed methodological approach was employed which comprised of secondary data analysis, statistical survey and focus group interview. The study also focused on comparing the performance of the manufacturing sectors of developing countries such as China, India and Malaysia with the manufacturing sector of Nigeria. As a valuable qualitative research technique, secondary analysis method was employed to review the analysis of previous researches to understand the performance of manufacturing sector in Nigeria with a historical perspective. Data from various journals, reports from past researches, magazines, books, electronic journals and web portals were collected to conduct the secondary data analysis.

A statistical survey was conducted, as a quantitative research method, through a questionnaire to study the views of professionals' regarding the Nigerian manufacturing organizations specifically about the manufacturing systems, product design and environmental uncertainty. For this purpose, 400 manufacturing firms were short listed dividing Nigeria into three zones and responses were collected from the representatives through a structured questionnaire. Further, to compliment the secondary data analysis and the statistical survey questionnaire, focus group interview was conducted to collect qualitative data for the research to plug in the uncertainty, if any, caused by the other two

methods. The data were collected by conducting the focus group interview with 10 experts from the Nigerian manufacturing sector.

Analysis of the secondary data revealed that the contribution from manufacturing sector in Nigeria towards the GDP is very low which in turn is affecting the economic growth of the country. The study revealed that the selected performance measures such as the product design, manufacturing systems and economic uncertainty are inter related and influence the performance of the manufacturing sector greatly. Nigeria depended largely on the oil sector and the low concentration on the development of other industries led the country to critical economic situation. High production due to import of raw materials, lack of infrastructure facilities and inadequate energy resources also accounted for the low performance of the manufacturing sector. The research revealed that lack of financial resources resulted in poor research and development work and difficulties in adopting updated manufacturing processes and introduction of new technology. The study also revealed that corruption at the government level hinder the growth of the manufacturing sector in spite of the donations and aid granted from different international institutions.

The secondary research also revealed valuable information regarding the performance of the manufacturing sector in developing countries such as China, India and Malaysia in comparison with that of Nigeria. The key attributes identified were the support of government through better policies, liberalization encouraging high foreign investments, due attention to innovation and technology leading to improved product design and manufacturing processes and research and development work given due importance.

The primary research in the form of survey questionnaire revealed that product designs are not satisfying in the consumer goods manufacturing in Nigeria and hence they are not competitive in the domestic and international markets. The respondents of the survey were of the opinion that there is a need for restructuring the manufacturing processes and the strategies need to be reformed to compete at the international level. The survey also confirmed the fact that innovation is not up to the expected level within the Nigerian manufacturing sector. Further, research revealed that environmental uncertainty and the political stability are affecting the development of the manufacturing sector. Moreover, lack of financial support proved to be the most important barrier in the development of Nigerian manufacturing sector.

The responses from the participants of the focus group interview revealed that factors such as product design, manufacturing processes, manufacturing strategy and manufacturing innovation were equally responsible for the inefficient growth and development of the Nigerian manufacturing sector. The interview revealed that poor infrastructure facilities, lack of financial support, heavy competition from developing countries such as China, India and Malaysia and inconsistent government policies were the major environmental challenges currently faced by the Nigerian manufacturing sector. The participants were of the view that lack of energy resources and inadequate power supply, lack of government support, lack of appropriate machinery, inadequate supply of raw materials and very low purchasing power of the consumers played a major role in hindering the quality performance of the Nigerian manufacturing sector. According to the participants, environmental uncertainty is key attribute for the low performance of the Nigerian manufacturing sector in comparison with the Chinese, Indian and Malaysian manufacturing sectors.

The findings of the primary research in the form of questionnaire survey and focus group interview supported and complimented the findings of the secondary data analysis as there was little contradiction between the findings of the secondary and primary research. The participants of the primary research and the findings of the secondary research were of the similar view that the product design, manufacturing processes, manufacturing strategy and manufacturing innovation were not up to the mark and hence affected the performance of the Nigerian manufacturing sector. The participants of survey questionnaire and focus group interview, in consensus with the findings of the secondary research, regarded environmental uncertainty as the key factor affecting the growth and development of the manufacturing sector in Nigeria. The primary research provided in depth analysis of the performance of Nigerian manufacturing sector in comparison with the developing countries such as China, India and Malaysia, thus filling the gap in the findings of the secondary research.

The participants of the primary research in the form of questionnaire survey and focus group interview stressed the need for diversification of the economy and trade liberalization so as to encourage foreign investments. The participants also expressed the view that there is need for improving the basic infrastructure and adequate supply of energy resources. Conducting research and development work, adapting to the advancement in technology, skill development and training and increasing the pay scales and incentives for the workforce were also recommended by the professionals who participated in the survey. The respondents also recommended the restructuring of the manufacturing processes, reform in

the manufacturing strategies and focusing on improving the quality and measures to reduce manufacturing cost for the development and growth of Nigerian manufacturing sector.

The key objective of the research was to address the impact of product design, manufacturing systems and environmental uncertainty on the performance of Nigerian manufacturing sector and to accomplish the objective six sub-questions were answered. The secondary research provided the history of the Nigerian manufacturing sector but the primary research in the form of survey questionnaire provided the opinions of the participants in terms of the performance of the Nigerian manufacturing sector with regards to product design, manufacturing systems and environmental uncertainty. The review of the literature and the results of the survey identified the various problems, issues and factors which are hindering and undermining the growth of the Nigerian manufacturing sector. The comparative analysis between the manufacturing sectors of China, India and Malaysia with that of Nigeria identified the factors creating the differences in the growth patterns, strategies and planning among these countries. The analysis also revealed the differences in operating environment among these countries.

Further, the findings of the statistical survey identified the strategies and policies that can help the underdeveloped countries in coping with the technological advancements in the manufacturing sector. The participants of the survey also gave necessary suggestions and recommendations for improving the performance of the Nigerian manufacturing sector. The research concluded that there is little contradiction in the findings of the secondary and the primary research, as the opinions of the experts from the field were similar to a great extent. The research also provided the suggestions and recommendations necessary to make positive changes for improving the performance of the Nigerian manufacturing sector. Finally, the research also identified areas such as methods and techniques to reduce the manufacturing cost, improving the financial resources and creating the realization among the authorities about the problems and solutions for the improvement of Nigerian manufacturing sector, this needed attention for further research.

1.8 EXPECTED CONTRIBUTION OF THE STUDY

The research is expected to bring some significant results that can help the manufacturing sector of Nigeria in deciding the strategies that can improve the performance of the sector. The thesis presents an in-depth analysis and evaluation of the performance and development of the manufacturing sector of Nigeria that could be helpful for the current

study as well as for future research. This is because, not much research has been done around the performance of Nigeria manufacturing establishments in terms of multiple manufacturing concepts like product design, manufacturing systems and environmental uncertainty. This research is an attempt to fill this gap as identified in the literature by exploring the mentioned concepts in greater details. Moreover the comparative literature analysis of Nigerian manufacturing sector with India, China and Malaysia unfolds many aspects of manufacturing successes and highlights many important challenges and limitations, as well as failures of Nigeria in attaining sustainable manufacturing excellence.

It is also hoped, experts related with the manufacturing sector as well as researchers intended to work in the same field will get a lot of information and help from this thesis because it presents an in-depth analysis of all the issues related with the topic of the research.

1.9 THESIS STRUCTURE

The thesis consists of the chapters described as follows:

- Introduction Chapter: The first chapter describes the background of the research topic and contains the description of the main concept, the needs, significance and scope of the study and the key objectives that are intended to be achieved from the research.
- Literature Review Chapters: The literature review chapters provide detailed and comprehensive information about the background issues related to the topic in order to provide a better understanding of the entire project. In this regard, the past and present performance of the manufacturing sector of Nigeria is explained with the help of the review of the related literature and reports. Also the literature review critically analyses the five concepts- manufacturing process, manufacturing strategy, manufacturing innovations, product design and environmental uncertainty that are used as basis for the study of the Nigerian manufacturing establishments.

- Research Methodology Chapter: This chapter contains all the information about the selected methodologies for conducting the research. It gives a detailed explanation on how a three-step research strategy made up of questionnaire survey, secondary data analysis and focus group interview that are executed.

- Data Presentation and Results Calculation Chapter: All the data collected from the survey results were gathered and evaluated using Microsoft Excel/SSPS so that the answers to the

research questions are found. Moreover, the key findings of the secondary research are explained along with the primary research findings in order to support the findings.

- Analysis and Discussion Chapter: This chapter draws interpretations with the help of the survey results, literature review and focus group interview. Using the key findings of the secondary and primary researches.

- Conclusion and Recommendation Chapter: This chapter summarizes the entire research. All the limitations faced in conducting the research are also explained. Furthermore recommendations for future research and suggestions for businesses are put forward.

1.10 TIME SCALE OF THE THESIS

The research covered a period of 36 months with the first 21 months spent on research itemizations and data gathering/management while the balance of 15 months was used for data analysis, thesis final compilation, reviews and submission for degree award.

1.11 DEFINITION OF TERMS AND CONCEPTS

Product design refers to the "idea generation, concept development, testing and manufacturing or implementation of a product that can be a physical object or a service" (Hesselbein et al., 2002).The term refers to the determination and specification of the parts of a product and their interrelationship so that they become a unified whole.

Innovation can be defined as "both the radical and incremental changes in thinking, in things, in processes or in services" (Chesbrough, 2003).

Manufacturing basically refers to the use of tools and labour to make things for use or sale. However in broad sense, it refers to "wide range of human activity, from handicraft to high tech, commonly applied to industrial production, in which raw materials are transformed into finished goods on a large scale" (Friedman and David, 2006).

Environmental Uncertainty is the "situation where the management of a firm has little information about its external environment that is in a state of flux and, hence, largely unpredictable. The organizations often face this situation in the decision making, problem solving, strategy and entrepreneurship, management, and leadership subjects" (Evangelista, 2000).

Manufacturing strategy basically comprises of decision-making problems in terms of manufacturing practices to achieve manufacturing objectives through linkages of performance measurement (Chien and Wu, 2007).

Manufacturing processes consist of the phases through which a product passes to get the shape of the finished product. The ideal manufacturing system must combine the benefits of highly automated and controlled systems through accuracy, mass production, uniqueness of product, benefits of versatile and adjustable systems.

CHAPTER 2

LITERATURE REVIEW OF MANUFACTURING AND MEASURES OF MANUFACTURING PERFORMANCE

2.1 INTRODUCTION

The review of the literature is divided into two chapters – chapter 2 and chapter 3. This chapter contains an explanation of, and information about the manufacturing industry, including the review of manufacturing process, manufacturing strategy, manufacturing innovation and environmental uncertainty, effects of technology and globalization and the importance of product design. Chapter three provides information about Nigerian manufacturing sector and a comparison with Chinese, Malaysian and Indian manufacturing sectors.

The review of the literature is basically aimed at providing comprehensive information and understanding of all past studies that are relevant to this research. Specifically, this chapter is focused on explaining research studies associated with manufacturing organizations from a global and Nigerian perspective, impact of technology on manufacturing and fast moving consumer goods (FMCG) manufacturing.

In order to conduct this review, five major measures of manufacturing performance were chosen and the entire thesis is based on them. They are manufacturing systems (manufacturing process, manufacturing strategy and manufacturing innovation), product design and environmental uncertainty. In this regard, clear understanding is essential about the importance and contribution of these factors so that there is a clear understanding as to why they were selected for the evaluation of the Nigerian manufacturing sector.

2.2 MANUFACTURING FROM A GLOBAL PERSPECTIVE

Manufacturing has become a global activity and people all over the world are involved in the manufacturing of different products using different strategies, processes and designs. The history of modern day manufacturing goes back to centuries. Some historians and experts believe that manufacturing was part of human activity even at the time when they used to have sufficient amount of agricultural products to meet their food requirements. People

then had a lot of time to concentrate on the tools and techniques through which they could develop different items for their own use as well as for trade purposes (Cochran and William, 1942).

Gradually people started developing particular skills and resources for the manufacturing of different items. In the mid-eighteenth century the industrial revolution emerged as a result of water-based explorations and the generation of new ideas for the development of different products (Clark, 1929). Though the manufacturing industry emerged from that time, since the start of the twentieth century, when manufacturing truly began and people started trying to improve the manufacturing process. To this end, people got involved in different studies, research works and management practices (Schroeder and Flynn, 2001), Cochran and William, 1942). Finally, modern manufacturing emerged in the last decade of the twentieth century.

The manufacturing process took its present shape after going through several stages. During the mid-eighteenth century the Frenchman Honoré le Blanc presented the idea of production of guns that was further developed by Eli Whitney.

People did not have facilities such as machinery and tools for manufacturing; however they developed the use of machines and templates and put their ideas into physical form. The Harvard Business School has played a very important role in the development of the manufacturing sector. The researchers associated with that school developed and presented some manufacturing strategy paradigms in order to provide better manufacturing management methods to the people associated with the manufacturing industry (Clark, 1929).

The work of these experts was more focused on issues of how the management of manufacturing companies can effectively employ labour, land, plants, resources and planning within their manufacturing processes as strategic and tactical decision variables that can develop competitive strategies for the development of manufacturing capabilities in their factories (Tryon, 1966). The Harvard Business School also explained the concept and importance of the factory and manufacturing trade-offs and that the management of the manufacturing companies must adopt a diverse strategy that can work for the creation of a focused factory doing a particular set of activities in an adequate and planned manner. Since then, the manufacturing industry has also realized the need and importance of maintaining

low cost manufactured products, a high standard and a quality as well as a high level of flexibility in the designing and management of the factories (Cochran, 1972).

The 1970s is regarded as a time when some of the major revolutionary changes occurred in management philosophies and technologies that were being used in the manufacturing process all over the world. During this period, the term and concept of "Just-in-time (JIT) production" emerged as one of the important manufacturing philosophies. Japan is regarded as the pioneer of this technology that basically refers to the integrated set of activities that are basically meant for the achievement and attainment of high level production and there should be usage of minimum inventories of parts in the process (Bluestoneet al., 1982).

There was another concept and manufacturing philosophy that came in front of the manufacturing sector along with the concept of JIT, which was the concept of "total quality control (TQC)". Both these philosophies worked along with each other and strived to reduce production defects and their main causes. Soon these philosophies became popular and many of the manufacturing sectors have developed the foundation of their activities on the basis of these philosophies (Slack et al., 2009). Advancements in the technologies and their implication in the manufacturing sector further introduced certain concepts and philosophies in the manufacturing industry. The factory automation concept was introduced in manufacturing that had significant impact on the performance and activities of the manufacturing world. Very soon the manufacturing industry witnessed the emergence of some advanced manufacturing concepts like "computer-integrated manufacturing (CIM), flexible manufacturing systems (FMS) and factory of the future (FOF)" (Licht, 1995).

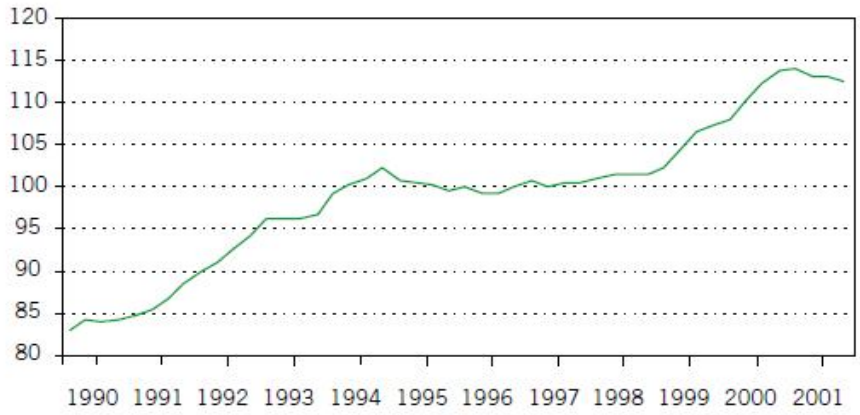
Since the 1970s, computers were also introduced into the manufacturing industry as a tool of managing operation problems. The application of "materials requirements planning (MRP)" during the same period was also regarded as a great breakthrough for the manufacturing sector as this approach allowed the integration of all the parts involved in complicated products to be put together within a computer programme. The production planners were thus enabled to adjust the schedules and inventory purchases of the manufacturing process through these computer programmes. In this way, the planners of the manufacturing process had the opportunity to meet the changing demands that arise during the manufacturing process (Slack et al., 2009).

The philosophy of Total Quality Management (TQM) became an important part of the manufacturing sector in the early 1980s. However, during the 1990s the manufacturing

sector truly realized the critical importance of this concept and manufacturing sector executives gave much more importance to quality management. For example, the American Society of Quality Control and the National Institute of Standards and Technology created the Baldrige National Quality Award in 1986 (Licht, 1995).

The establishment of this award was a significant step that further enhanced and assisted the movement towards the concept of quality within the manufacturing sector. The award worked for the recognition of the five manufacturing companies that show their outstanding quality management systems throughout the year. Moreover, the International Organisation for Standardization also began to issue the ISO 9000 certification standards and this was another significant step that set certain quality standards for the manufacturing companies operating all over the world (Slack et al., 2009).

As the world progressed towards the era of globalization and increased competition, the manufacturing sector also realized the need to be more competitive at an international level, especially after the economic recession in the early 1990s paved the way for certain innovations within the manufacturing sector and the manufacturing companies at large restructured their manufacturing activities and process and adopted some innovative strategies in order to run their operations. The article “Reengineering Work: Don't Automate, Obliterate”, written by Michael Hammer, further influenced the manufacturing sector to a great extent and the new concept of business process reengineering (BPR) emerged within the manufacturing industry (Licht, 1995). Graph 1 shows the global manufacturing output from 1990 to 2001. The data is not very sufficient because it stops at 2001 which is not good enough but still some useful insight is revealed. It can be found from the graph that there was rapid increase between the period of 1990 and 1994. After this, the output flatted out, this may be due to Asian financial turmoil. Then there was again an increase from 1998 to 2000 and it dropped again in 2001 because of the high-tech burst. However, it can be agreed that it has increase again between 2001 and 2010 as living standards had growing up (Koren, 2010).



Source: ONS

Graph 1 - The global manufacturing output between 1990 and 2001.

X axis of the graph represents years 1990 to 2001 while the Y-axis represents Global manufacturing index

According to the BPR philosophy, the manufacturing companies should make revolutionary changes in their manufacturing process and operations rather than going for evolutionary changes. Manufacturing firms should take a new look at their efforts in order to review their performance as compared with their objectives and then on the basis of this review they should eliminate non-value-added steps from the manufacturing process so that they can compute the rest of the steps of their process in such a way that they can attain their manufacturing objectives in an efficient manner (Licht, 1995).

In the light of this philosophy several other concepts emerged within the field of manufacturing and then the manufacturing sector strived to manage the flow of information, smooth flow of services and raw material from the suppliers to their manufacturing units and then finally to the warehouses and factories from where the consumers could get access to these products. Soon, the trend of outsourcing and mass customization also took an important place within the manufacturing sector and the manufacturing companies were forced to find the most flexible ways through which they could meet the increasing demands of the consumers. The manufacturing sector was called upon to be highly responsive towards making changes in their activities and strategies so that they could meet the rapidly changing needs, tested expectations of the consumers (Slack et al., 2009).

The manufacturing sector then also set certain priorities on the basis of different research studies conducted to identify the operation priorities of the sector. It is disclosed in most of

the research studies that the manufacturing sector is essentially required to focus upon a number of issues including cost, product quality and reliability, delivery speed, delivery reliability, ability to cope with changes in demand, flexibility and speed of new product introduction (Licht, 1995). Each and every sector of the manufacturing industry recognized the importance of these priorities and is focusing on them in order to come up with competitive products offering certain advantages to the consumers (Slack et al., 2009).

The concept of quality also became very important within the manufacturing sector and manufacturing companies have been focusing upon product quality as well as on process quality. It is believed that manufacturing companies have to maintain quality standards in the quality of their finished products and during the entire process of manufacturing to assure the success of the product in terms of its popularity among consumers, increased sales revenue generation and competitiveness. Along with quality the delivery time of the products also matters in the manufacturing sector as people all over the world are in favour of fast moving consumer products that easily accessible. Thus, the manufacturing companies are required to deliver the finished products to the consumer before their competitors can or they can lose their potential or existing consumers.

Moreover, the flexibility of the manufacturing companies also becomes very important to remain competitive within the sector (Licht, 1995). The last decade of the twentieth century and the beginning of the twenty-first century, brought many lessons for the manufacturing companies and the manufacturing sector has been required to respond to the tremendous changes occurring all over the world due to the advent of new technology. The methods of manufacturing products and the management of the manufacturing operations and process has changed a lot in the new era and the manufacturing companies are now required to make best possible use of the available resources to assure the high quality of their manufactured products (Schroeder and Flynn, 2001).

For this, it is necessary that the manufacturing companies focus on the efficient utilization of the resources required in the manufacturing process. These issues have become more and more important for manufacturing companies because the advancements in communication technology, especially the rising popularity of the internet, have enabled manufacturing companies for different countries to access consumers in different countries and as a result many of manufacturing companies are facing the risks of losing their existing and potential consumers (Licht, 1995).

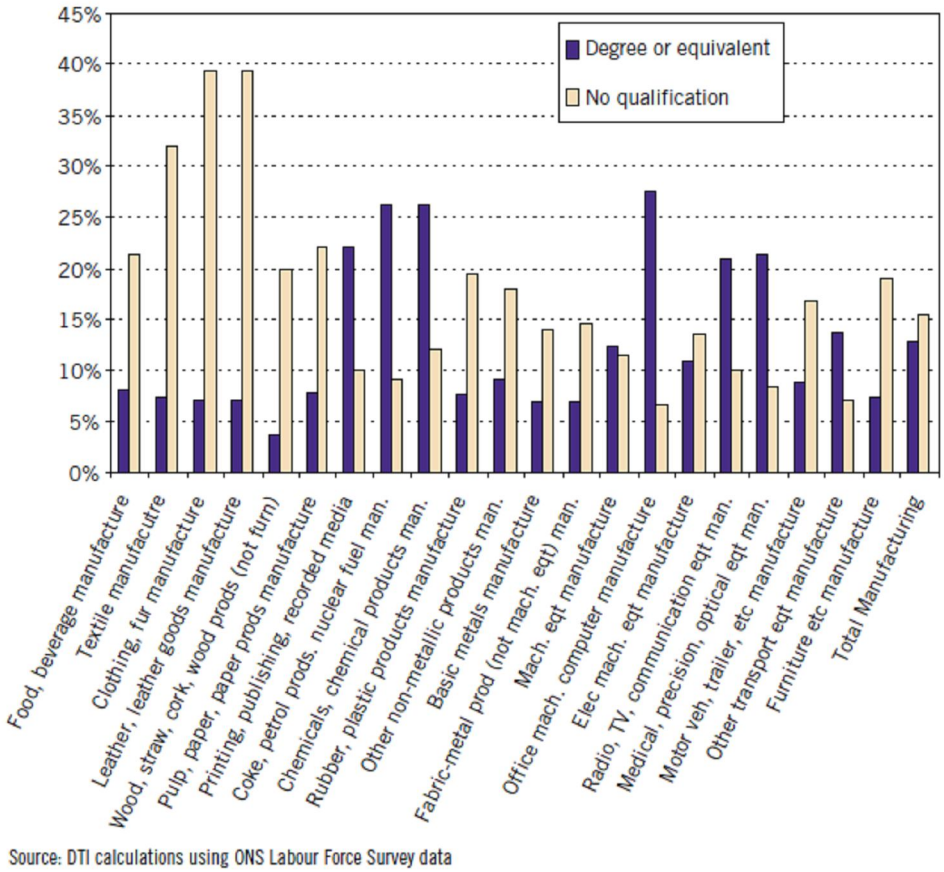
This situation could be handled by the manufacturing companies only by being highly innovative and competitive. Manufacturing companies are now required to develop superior products that consumers can get at lower prices and at the same time it is also necessary that consumers are provided with the facilities and opportunities to get these products early with the help of timely delivery systems that must be managed by the manufacturing companies (Slack et al., 2009).

For this reason, management of resources and manufacturing process are essential along with the usage of advanced and appropriate technology. Though the above research threw light on the historical perspective of the manufacturing industry, these studies did not describe the stages of development the manufacturing sector had to go through. It is also important to explain how the new era of manufacturing is bringing challenges for the countries at the domestic and international level and this gap in the literature is filled in the analysis part of the thesis because this research study explained the effects of advancement in technology on the manufacturing sector and the changed responsibilities of the countries, taking Nigeria, China, India and Malaysia as examples.

2.2.1 Consumer Goods Manufacturing (Particularly Fast Moving Consumer Goods)

The fast moving consumer goods (FMCG) have also been given the name of consumer packaged goods (CPG). These are the type of products that are commonly sold very quickly and the prices of these products are supposed to be relatively lower than the other type of products. One might think that sales of consumer goods at relatively low prices will generate low profits. However, despite the small amount of absolute profit on sales of FMCG products, these have proved to be profitable for the manufacturing companies as these products are most of the time sold in large quantities and as a result there is generation of cumulative profit on the manufacturing and sales of these products (Aydınet al., 2005).

There is a wide range of products that come under the umbrella of consumer goods like toiletries, soaps, cosmetics, teeth cleaning products, shaving products and detergents. At the same time, there are many non-durable products including different glassware, light bulbs, batteries, paper products and plastic goods that are also categorized as FMCG. Graph 2 further shows the global prerequisite by manufacturing sub-sector. Generally, people think that common usage commodities like soaps, cosmetics etc. are FMCG but it is also important to mention that different consumer electronics, packaged food products and drinks can also be categorized as FMCG (Marques and Puig, 2010).



Graph 2 - Global prerequisite by manufacturing sub-sector

The International Standard Industrial Classification (ISIC) explained that products and goods will be regarded as FMCG when they are offered for retail sale at non-specialized stores. However, products like food, beverages and tobacco, pharmaceutical and medical goods could be sold in specialized stores. FMCG can also be delivered to consumers through mail orders, stalls, markets and non-store retail sale points (Marques and Puig, 2010). Electronic items like mobile phones, cameras and MP3 players also come under FMCG but they are often sub-categorized as fast moving consumer electronics.

The need of innovation in design is the basic requirement for all types of FMCG, especially mobile phones, MP3 players and cameras which are required to be more aligned with technological changes and people are used to replacing these products within small periods as they find that these types of products become out of date very quickly. Thus, the designing of these types of consumer goods is even more challenging for manufacturing companies as they have to capture the attention of the consumers by offering them

innovative products with a shorter life cycle and thus very soon having to prepare an advanced version of their product that can meet the rapidly changing requirements of the consumers (Aydın et al., 2005).

FMCG are an important part of the manufacturing sector and for many decades they comprised a large proportion of manufacturing products. During the last century, there was an increase of five hundred percent (500%) recorded in the productivity of FMCG that showed that consumers are in great need of consumer goods (John, 2005). At the same time, it also became clear that due to an increase in demand and productivity, manufacturing companies are required to focus more upon offering unique features and qualities in FMCG products to the consumers to remain competitive in the market place. The FMCG manufacturing has also witnessed the impact of the advancement of new technology to a greater extent (Marques and Puig, 2010).

Three to four decades ago, the popular concept about the usage of the microchip in the manufacturing of consumer goods did not exist. However, the revolutions which have occurred in the manufacturing sectors presented FMCG manufacturing with the usage of the microchip that allows companies to manufacture products at low production cost. Moreover, highly integrated automated production also changes the operations and activities of the manufacturing sector to a greater extent (Aydın et al., 2005). The introduction of the microchip in the manufacturing of consumer goods is regarded as one of the most significant developments of the twentieth century as it allowed the manufacturing companies to do away with the traditional direct headcount methods by ninety percent and along with that there were fundamental changes in the their management tasks.

Compared with the past, the manufacturing of FMCG is now supposed to be more challenging and requires adequate attention and management. Some fundamental changes in the manufacturing sector have changed manufacturing patterns of FMCG as well. In the modern day there is high output as well as highly automated facilities available for the manufacturing of FMCG. The availability of these facilities is a great opportunity for the manufacturers. However, they also have to make some fundamental changes in their manufacturing process so that their process and manufacturing system can be aligned with the changes introduced in the sector by technological advancements (Aydın et al., 2005). The manufacturers of today are facing a great challenge in the form of appropriate usage of technological devices and methods in the manufacturing of their products. New tools and

techniques of manufacturing of products are being introduced in the manufacturing sector after very short time intervals and the manufacturing companies have to show their flexibility to adopt the new technologies (Marques and Puig, 2010).

However, all the technological devices and techniques are not beneficial for the manufacturing of certain types of products and the manufacturing sector managers have to decide what technology should be adopted. In the same way, the skills and qualifications of labour also affects the technology adoptability of manufacturing companies and before going on to adopt any new technology, the manufacturing company has to keep in mind the potential of their work force. If they believe that the workforce will handle the new technology with existing skills or after getting some training then they can go for the adoption of the new technology (Aydın et al., 2005).

However, if the labour lacks the potential skills to make right use of the new technology then the manufacturing company cannot enjoy the benefits of the new technology. Rather, a lot of money and time will be wasted in their attempt to adopt the technology and their routine manufacturing activities will also be affected, resulting in decline of productivity and revenue. The management of the work force is also an important and challenging issue for the managers, because the introduction of new machinery in the manufacturing process reduces the required number of workers but at the same time the skills and qualifications of the workers become even more important for the company which has to select the most suitable person for handling matters of manufacturing process and management (Frazer, 2005).

In this way, it is proved that the manufacturing of FMCG is an integral part of the manufacturing sector all over the world. Now, manufacturing of FMCG has become more challenging due to a number of reasons. First of all, consumers have become more aware as they get access to information about the varieties and features of different products through different communication sources and as a result, there has been a rise in the expectation level of the consumers. Thus, manufacturing companies have to work out a lot in order to meet the high demands and expectations of their consumers. At the same time, the FMCG manufacturing sector is also facing a great challenge in the form of shorter life cycle of the products (Aydın et al., 2005).

With each new day, there are new facilities introduced with different products and the manufacturing companies have to be ready to implement and add these new facilities in

their products. Now, the manufacturing companies are required to manufacture consumer goods with a shorter life cycle so that they can offer new products very quickly. In this regard, it is very important that manufacturing companies focus on bringing innovative ideas to their product designs so that the consumers can benefit from the purchase and consumption of such products (Davis and Heineke, 2005).

The discussion threw light on the overall importance and contribution of the FMCG but the above studies did not explain how Nigeria can cope with the emerging challenges of this field and what strategies and polices will help it in gaining economic development through FMCG manufacturing. Thus, a gap is found in the literature and this research study strives to fill this gap by identifying the factors that can Nigeria to maintain a high standard of manufacturing, especially in the FMCG sector.

2.2.2: The Impact of Technological Advancements on the Manufacturing Sector

The impact of advancement in technology has been at the centre of a debate between experts and researchers for a long time and along with the emergence of each new technology, the debate gets further momentum. Most researchers agree that new technology is not only an opportunity for the manufacturing sector but it is also a great threat to it. Productivity, cost effectiveness and quality of the manufactured product have improved to a great extent due to the advent of new technologies. At the same time, the manufacturing sectors have to think about the issues of the impact of technology on employment as well as on their routine operations. As the usage of technology requires skilled and qualified labour for the performance of technology-based manufacturing and in this situation the unskilled labour gets little chance of being hired in the manufacturing sector and consequently the rate of employment might go on declining (Chas and Aquilano, 2000). According to a report by Oxford Economic Forecast, India and China are the countries with the cheapest labour in the world (Marques and Puig, 2010). Both India and China offer less than five US dollars per hour per person labour charge, which is far below USA that offers up to US $ 20 per person per hour. This implies that their economic status is still low as compared to other countries like UK, France and USA, which offer beter payments to their labour force. This is not suprising because highly populated countires tend to have cheap labour as argued by Adeolu (2007).

All over the world, the manufacturing sector is witnessing changes led by technological advancement and in most countries the manufacturing sector is performing activities with

the use of innovative tools and techniques, having given up old traditional methods of manufacturing. The use of technology not only provides the manufacturing sector with certain opportunities in terms of cost effectiveness and high quality production but also helps the manufacturing sectors to be competitive at domestic and international levels. The technology is improving at such a pace that presently, the modern machinery used in the manufacturing sector is around 20-25% more productive than the machinery that was used in the manufacturing sector just five years ago (Krajewski and Ritzman, 2001).

This shows that the technology is rapidly having a significant impact on the manufacturing industry and the manufacturing companies are also required to be more updated and aligned with the changes and advancements in the modern machinery and manufacturing techniques. At present, the manufacturing sectors in most of the developing and developed countries use different automation levels with little manual tasks performed during the manufacturing process (Davis and Heineke, 2005).

Due to these reasons, there is less need for workers in the manufacturing companies and at the same time the companies are able to manufacture more products by utilizing less cost and time. Moreover, the trade liberalization and fast transportation technology enables manufacturing companies to get the raw materials from different destinations where they can have the opportunity to select among different varieties, quality and cost. In this way, the manufacturing sectors generally succeed in getting raw material and labour at low cost due to information and communication technology advancements as argued by Krajewski and Ritzman (2001).

Dillworth (1999) observed that the manufacturing sector is regarded as one of the most important players in the economic scenario and the performance of the manufacturing sector has the capability to strongly affect the economic development of a country. Due to its critical importance, it is very important for the manufacturing sector to have great awareness and realization regarding the usage of appropriate technology to get the benefits of cost effectiveness and high production quality (Davis and Heineke, 2005).

There is another great importance in noting that technology cannot just improve the performance of the large scale manufacturing companies but that the small and medium enterprises engaged in the business of manufacturing can as well draw many benefits from technological advancements. This is through the usage of computer controlled tools and devices; they can improve their profitability and quality (Krajewski and Ritzman, 2001).

Porter (2000) pointed out that due to globalization there is very tough competition in each and every sector and industry. The manufacturing sector is also witnessing a highly competitive environment and in order to survive and face the challenges of the emerging situation, the adoptability and implementation of technology is the tool that can help the manufacturing companies most to offer competitive and high quality products to consumers at different market levels. The manufacturing sectors by neglecting the importance of advanced technology adoptability cannot manage to survive in the highly competitive contemporary market place and they cannot play any supportive role in the development of their countries.

Lefebvre et al., (2002) explained that technology has contributed in some revolutionary changes within the functions and activities of the manufacturing companies. Now, the manufacturing sector has to work on the basis of different manufacturing technology and along with that it has to be ready to adopt the new concepts that enter the manufacturing world. Technology is regarded as a weapon for manufacturing firms because through the usage of advanced technology they can be more competitive and cost effective. Even small manufacturing companies can meet the requirements of demanding consumers in a successful manner because new tools and devices allow them to manufacture high quality products with innovative features even at low cost of production.

Garsombke and Garsombke (1999) conducted an empirical study to examine the effects of technology usage on the performance of the manufacturing companies. The study results indicate that the manufacturing companies that are more open towards the usage of advanced technology within their manufacturing process are observing rapid and positive changes in their performance level in terms of innovative product design and high quality of the manufactured products. The study also indicated that most of the manufacturing firms refer to automation and computerization as the use of advanced technology and stronger links between the manufacturing companies and these technologies assures better performance.

Mazumdar and Mazaheri (2003) evaluated the performance of African manufacturing firms in terms of “production output, increases in profit, increases in sales, increases in return on investment, and decreases in lead time” and revealed that all of these performance measures are found to be positively related to the usage of technology in the manufacturing sector. The analysis of the manufacturing companies on the basis of the above-mentioned

performance measures also indicated that the companies lagging behind in usage of the technology usually face tough competition in the market place and many of the manufacturing companies neglecting the use of technology in their manufacturing process are at higher risk of losing their market position, even going out of business.

Steiner and Solef (1998) also conducted an empirical analysis of the performance of manufacturing companies. The researchers evaluated the performance of eight manufacturing companies on the basis of their financial performance and found that four out of eight manufacturing companies there is clear evidence of the positive effects of the use of advanced technology. The four firms that were open to the usage of technology and amended their manufacturing process to align it with modern techniques obtained higher returns on their investments and at the same time their sales volume also grew significantly as compared with their competitors.

The researchers also found that among the other four manufacturing companies, two showed signs of improvement in their financial position and when these firms hired a more qualified and skilled work force to handle the advanced tools and machinery of production, the journey of improvement began. The other two companies showed a decline in their performance after the adoptability of the new technology. In order to identify the reasons behind these failures, the researchers found that proper management and availability of skilled and qualified labour is also necessary to make positive use of advanced technology in the manufacturing sector, otherwise the companies cannot take advantage of the advent of new technology.

Liberatore and Titus (2001) observed that the usage of technology has had a significant impact on the manufacturing industry and many manufacturing firms have recorded a rise in sales revenue as a result of technology usage. The researchers also pointed out that due to technological advancements in the manufacturing sector there were two types of major changes occurring within the manufacturing industry. First of all, there was improvement in the overall performance of the manufacturing sector and secondly, the perceived needs of consumers and market were also well addressed by the improvement in performance.

There was also an observation by consumers that technology adaptation has the greatest impact on product design in some cases. At the same time the consumers look towards the manufacturing companies and sectors that respond towards technological advancements as

they believe that such manufacturing companies can provide them with different products with better improved functions and having more and innovative features at lower cost (Slack et al., 2009).

Schroeder et al., (1999) revealed that the increased usage of computers has the most significant impact of technology on the manufacturing sector. Many of the manufacturing companies now employ computer-aided manufacturing (CAM) at different levels of the manufacturing process. Most of the time the computer-based manufacturing planning and management tools are employed in manufacturing companies that allow them to monitor and control their manufacturing process and to link different manufacturing activities in the process throughout the organisation. The companies are facilitated with the data acquisition and control network spanning as a result of using computer-based management and manufacturing planning tools.

Chas and Aquilano (2000) pointed out that technology has direct and in most cases significant impact on the performance of the manufacturing sector as technology usage assists the manufacturing companies to accomplish their manufacturing process at relatively low cost. At the same time the manufacturing sector is also enabled to ensure rapid delivery, high quality and customer satisfaction through providing competitive products using advanced technology. Dipak and Ata (2003) revealed that technology in the manufacturing sector is now utilized at each and every phase and in the developing and developed countries the rate of technology usage in the manufacturing process is much higher than that of the underdeveloped countries.

The researchers pointed out that there are many advanced technologies that are generally applied in the manufacturing sector, like automated handling equipment, CAD/CAM systems, advanced management techniques like JIT, simultaneous engineering, and TQM. The manufacturing companies adopt these technologies as a requirement of their manufacturing process and strategy. The research also disclosed that the usage patterns of technological tools are different for different scales of manufacturing companies: the SMEs adopt and utilize different manufacturing technologies compared with the large scale manufacturing companies as per study by Liberatore and Titus (2001).

However, the impact of technology usage is significant for the large, small and medium scale organisations. Thus, it is found that the technology has drawn major impact on the

performance of the manufacturing sector. In the modern era, technology has become a great weapon for the manufacturing sector through which they can get assistance for their successful survival in the highly competitive and technology-driven market place. At the same time the above discussion also revealed that manufacturing companies concentrating more on advanced technology usually witness significant improvements in their sales revenue and financial performance (Krajewski and Ritzman, 2001).

Though the impact of technology on the manufacturing industry has become very clear with the help of the review of the above research studies, at the same time there is an important point lacking in these research studies, which is the problem of how, despite all the limitations and problems, the underdeveloped countries can align themselves in accordance with the technology driven changes in the manufacturing industry. While taking Nigeria as an example this study explained how the countries can draw benefits from the ongoing advancements of technology in the manufacturing world and what the main issues are upon which countries have to focus.

2.3 MEASURES OF MANUFACTURING PERFORMANCE

The thesis strives to analyze the performance of the Nigerian manufacturing sector during the last 25 years. Moreover, this performance is also compared with the Indian, Malaysian and Chinese manufacturing sectors' performance to find the main reasons behind the differences in the growth, development and contribution of their manufacturing sectors in the economic growth of these countries.

It is necessary that in order to measure and analyze the performance of any part of the manufacturing sector there should be some specific features and attributes that could be examined and then on the basis of this examination, the analysis of the manufacturing sector performance could be conducted. Thus, there are three performance measures selected to review the performance of the Nigerian manufacturing sector - manufacturing systems (manufacturing strategy, manufacturing process and innovation), product design and environmental uncertainty. The thesis presents a review of the manufacturing sector performance of Nigeria on the basis of these three measures and the following review of the literature is intended to explain in detail the concept and importance of these measures for the manufacturing sector in order to justify the selection of these three elements as the key measures of manufacturing sector performance.

2.3.1: Product Design – Importance and Contribution to Manufacturing

Product design possesses an integral position in the entire manufacturing process. Product design is one of the cross-functional and knowledge extensive activities that have great importance in the highly competitive market place of today (Corswant et al., 2002). The term product design is used to refer to the process that began with the generation of the main idea or concept regarding the product, the development of this idea, its testing and then finally the manufacturing and implementation of that idea in order to give it a physical form of any product or service (Hesselbein et al., 2002). The term product design basically refers to the idea generation and concept development regarding the product and then the manufacturing of the product or implementation of the idea and concept into the physical object that is called the product or service.

Figure 1 shows The Eco strategy Wheel is an element of the Sustainable Value software which was developed by the Delft University of Technology in the Netherlands. This tool is used to improve environmental performance of a product by prioritizing 7 environmental strategies – selection of low-impact materials, reduction of materials use, optimization of techniques, optimization of distribution system, reduction of impact during use, optimization of initial life time, optimization of end-of-life system.

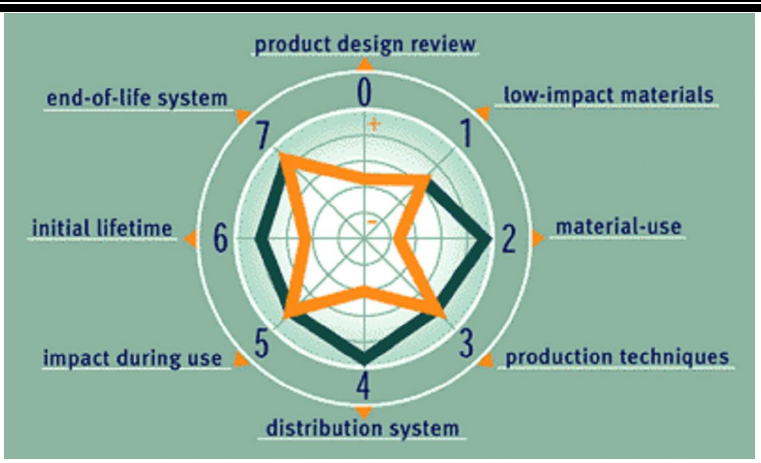


Figure 1 - Eco Design Strategy Wheel

Source: http://www.io.tudelft.nl/research/dfs/ecoquest/welkom/Entry.html

The Eco Design Strategy Wheel is a graphical representation of all possible Eco design strategies throughout the lifetime of a product.

In the manufacturing sector, product design has an important role to play and ideally it is considered that the product designers must strive to combine art, science and technology so

that in the end they can come up with a tangible product or service. Advancements in technology have further broadened the scope of product design as this process is very much facilitated and enhanced due to the advent of modern digital tools through which the designers of the products can communicate, visualize as well as analyze their ideas more quickly. Thus technological advancements have changed the product design concept as well and the product designers of today are required to be capable of integrating with art, science and technology in fluent ways (Hesselbein et al., 2002).

As globalization has contributed to the fast pace of competition, companies are now striving to attract consumers through attractive product designs. In almost all of the business organisations, product design is regarded as the key strategic activity because it is a fact that the revenue of a company largely depends upon new product designs (Droge et al., 2000). Social scientists have equally highlighted the significance of product design for businesses and it is identified by many researchers as one of the most important parts of business planning and strategy.

Koufteros et al., (2005) explained that product design is highly regarded as a factor that has the capability to influence organisational success because it is a critical factor that can set the core characteristics, features, functions and performance level of a product and service according to the demand of consumers. Koufteros et al. (2001) observed that the recent awakening in realization of the critical importance of product design is led by the fact that consumers have now become more demanding and they have a lot of choices and opportunities to quickly switch over from one product to another due to the fact that there is a shorter life cycle of products that can meet the rapidly changing demands of consumers.

Dick and Basu (1994) revealed that product design is an important part of manufacturing and for the successful and competitive level of product designing it is necessary that the product designers associated with the manufacturing sector must be well equipped with the skills and capabilities that are essential for designing products that can generate revenue for the company. For this purpose it is necessary that product designers must possess the ability to manage the design projects and also to subcontract with the areas related to the design industry.

Process Domain	Information/Knowledge Domain	Infrastructure Domain	Organization Domain
Business context engines	Business data	Computers	People
Planning engine	Business profiles	Operating systems	Roles
Visualization engine	Business models	Display devices	Organizational structures
Business tools	Data models	Networks	Alliances

Table 1 – Classic aspect of the four realm desigm, Source: Iyer and Gottlieb, 2004

Table 1 illustrates the process domain which includes the processes, procedures, business tools, tasks that encode business rules, and dependencies required to support the various functions within a business. It includes the applications needed at the levels of operations, management control, strategic planning, and information / knowledge domain. This domain includes business rules and business data and information of all types, their usage, interrelationships and demographics, as well as their definitions, ownership, distribution, and composition. Meta-data, system data, and operational data are also included within this domain. Infrastructure Domain includes hardware and facilities, system software, data storage resources, networks and communications, human interfaces, and other underlying technologies. It is the platform that supports the activities and interfaces of the other domains. Organization Domain includes business people and their roles and responsibilities, organizational structures and boundaries, as well as their interrelationships to alliances, partnerships, customers, suppliers, and other stakeholders in the enterprise.

Fornell (1992) explained that before thinking about the concepts and ideas for product design it is very important that the people associated with the manufacturing sector must have a clear idea in their mind whether or not there is a need for the product and what would be the potential usage of the product that they are going to design. The answers to these questions can help them in determining the features of the finished product which need also be in accordance with the needs and demands of the consumers. In other words it can be said that product designing must be done on the basis of adequate research work regarding consumer demands and expectations so that the product can attain a good position in the market and can also bring competitive advantages to the company as well as

to the entire manufacturing sector. However, Fornell's thinking appeared not to include disrupt products or technology which require different concepts of product design.

McDermott et al. 2002) clarified that product design has been among the most critical success factors for the businesses for many years, however in recent years the importance of product design has further increased due to globalization and high competition. In this regard it is necessary that the manufacturing firms must emphasise innovative product designing so that they can increase their revenues. The rising demands of the well aware consumers of today are also giving momentum to the strategic importance of product design.

Song and Montoya (2001) revealed that the manufacturing sectors are striving to earn high revenues and to contribute to the economic growth of the countries must pay proper attention to product design because it draws direct and significant impacts on the critical determents for success.

In the future, the importance of product design will become more critical. People used to select products on the basis of price and quality but along with these attributes product design has become another important influential factor and now the manufacturing firms are required to focus on the issues of innovation, full featured products, recyclables, operating life, liability, warrantee and long lasting attributes of the product (Reichheld, and Sasser, 1990).

Reichheld and Sasser (1990) pointed out that the manufacturing sectors are demanding innovative product designs as technology usage is getting popular in the sector. In this situation the product designers that are capable of giving unique product designs to the sector are considered as strategic and valuable assets for the companies. The country can bring many competitive advantages and in the long term the manufacturing sector can support the economic development of the country through valuable contribution.

Donna et al. (2000) revealed that the companies operating in the manufacturing sector have now realized the importance of product design as a tool that can bring them a variety of competitive advantages and that is why many companies are giving critical importance to product design in their firms so that they can manufacture products with innovative ideas that can meet the demands of the people and also make their position strong in the market place. Due to this fact, many of the successful companies in the world have recognized product design as a strategic tool and they are concentrating on this issue. In most of the

successful manufacturing companies product design is regarded as one of the major parts of their function and these companies are progressing well on the basis of giving this priority to product designing.

Jones and Sasser (1995) highlighted the importance of product design for the success of the manufacturing sector and for this purpose the researchers conducted an empirical study to investigate the relationship between product design, sustainability and good quality production in the manufacturing sector. The results of the study disclosed that product design is among the factors that can contribute towards zero reject in the production process.

However, there is a clarification that there are certain other factors, which have to be accommodated with effective product design in order to assure the success of the manufacturing process. Among these factors, environmental uncertainty, the skills of the workers and technology usage are also important factors that can work along with product design. It was also revealed companies associated with the manufacturing sector must develop awareness about the relationship between these factors so that they can attain high quality production through the effective management of these factors (Jones and Sasser, 1995).

Oliver et al. (1997) conducted research into the significance of concentrating upon product designing and revealed that manufacturing companies are facing a great challenge to retain their existing customers as it is necessary for them to gain loyalty of their existing customers according to consumer behaviour studies conducted by Martin et al. (2006). Thus the manufacturing sector has to focus upon the demands of the existing consumers with the help of different strategies.

In this regard, the companies must understand and embrace the importance of product design because consumers want to see new features in the products that can meet their changing demands. Thus, product design is an important tool through which the manufacturing companies can ensure loyalty from their customers. Successful companies are focusing more and more on product design so that they can attract new consumers and also retain the existing ones, can continue to maintain their position in the market place and can gain competitive advantage through inventive product designs (Oliver et al., 1997).

Schneider and Bowen (1999) pointed out that for most of the manufacturing companies it has proved to be a difficult task to capture new markets if compared with service oriented companies. However they can easily retain their existing markets if they have clear understanding about the critical importance of product designing to keep their consumers loyal. In this perspective, product design is regarded as a fundamental tool that can bring prosperity and stability to the companies.

Product designers and the owners of manufacturing companies are also getting more aware of product design, therefore this function is achieving a strategic position in most of the manufacturing sectors and if any manufacturing firm neglects the importance of product design, it has little chance of survival. Gerwin and Barrowman (2002) emphasized that product design can bring significant changes in the performance of a business, thus it is necessary that companies must focus on this issue and realize the importance of product design to improve and stabilize their efficiency and profitability.

Shoemaker and Lewis (1999) conducted a study to understand the importance of product design and disclosed that if the companies effectively manage product design, there are great possibilities to ensure the loyalty of their consumers because the consumers of today look for innovative features in their products. For this it is necessary for manufacturing companies to research consumer behaviour and then design the product in the light of this consumer research so that their products can successfully meet the expectations of the consumers. In return the company stands not only to gain in profits but also contribute to the overall performance of the manufacturing sector. In this way the economic growth and development of the country will also be affected and the high quality and popularity of the product will ensure the successful operations of the manufacturing sector.

Droge et al., (2000) revealed that advancement in technology has brought some revolutionary and conceptual changes in the commercial world and companies have to deal with their potential and existing consumers in quite a different manner compared with the past. In the new situation it is crucial that the design of products is also an important attribute that can persuade their consumers to stick with their products.

In the early days, the marketers and manufacturers supposed that consumer loyalty had little to do with product design but in the advanced world product design counts for a lot in maintaining consumer loyalty, and as a result the companies of today have to focus more and more on product design as one of their major activities. This concentration and focus

upon product design assures the success of manufacturing firms as more work on product design can come up with ideas that can influence consumer behaviour in a more effective manner and as a result manufacturing companies, the entire sector and the country will get the benefits through the dynamics of product design (Droge et al., 2000).

Beugelsdijk and Cornet (2002) observed that product design has emerged as an important issue for the various people and organisations related to the manufacturing sector. Consumer goods manufacturing companies in particular now have to focus much more on the designing of their products if they want to ensure the success of their business. Furthermore the technological advancements pave several new ways for generating and implementing unique ideas of product design due to which the sector has become highly competitive over the last few years.

Significant developments in the manufacturing field during the last few decades have raised several question marks over the issue of survival and competitiveness of the manufacturing firms that are not focusing on bringing new ideas and concepts to their product designs. As globalization has enabled companies and manufacturers of all sizes and scales to operate at an international level, so in this situation the companies are also required to respond to the changes occurring in the rapidly changing surroundings.

As per this regard, concentration on unique as well as significant product design can help the companies not only to operate successfully at an international and domestic level but also to take an active role in the growth and development of their countries. Thus the manufacturing companies have to respond to technological advancements so that the implementation of the latest technologies in manufacturing design can bring them sustainable growth and stability .

Droge et al. (2000) explained that due to the emerging importance of innovation in product designing, the manufacturing sector is also searching for the individuals that can give new ideas and concepts to the manufacturing world. The realization of the importance of product design can be seen very clearly from the rising demand of the creative individuals and professionals in the manufacturing sector. The manufacturing firms now look for the motivated specialist who should have an understanding of all the aspects of the manufacturing sector. In this way the manufacturing sectors are expressing their desire for creative individuals who show great awareness about product design. New products fail to

capture the market value most of the time due to many reasons, which include but not limited to unfamiliarity, competition and fear to try new merchandise by the potential buyers.

Song and Montoya (2001) explained that quality is an important issue that is attached to product design and the product designers of all types of goods and services have to take care and provide a standardized quality to the consumers. Many experts also believe that product design has an integral role to play in shaping the quality of a product. In order to ensure the quality of the product through design, it is necessary that the product must be designed with such functions that can ensure success and reliability to the consumer and along with that it is also necessary that the quality of the product must improve along with the improvement in the operating or performance characteristics of the product.

Thus the above review of the studies conducted by different researchers during different periods clarified the importance of product design for the manufacturing sector and it become apparent that the manufacturing firms have to give more and more attention towards products as this can bring them a wide range of advantages and can assist them in stabilizing their position. There is a revelation from the above review of the literature that product design has been given attention in the manufacturing sector for many decades according to a study Krishnan and Ulrich (2001).

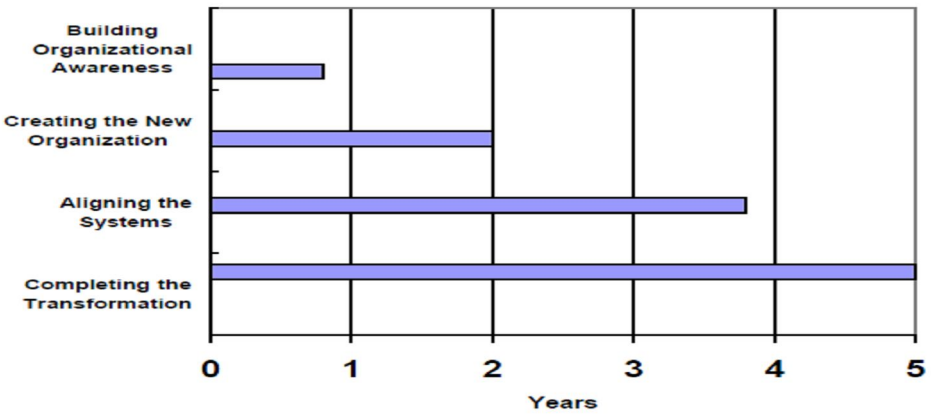
In the recent years the advancements in technology have further broadened the scope of product design and in order to meet the requirements of highly demanding consumers and a highly competitive market condition. The necessity for manufacturing firms to give strategic and critical importance to product design is highly required. Thus in the light of this review of the literature, the selection of product design as a measure of performance of the Nigerian manufacturing sector is justified.

2.3.2 Manufacturing Process – Importance and Contribution to Manufacturing

Manufacturing process is the name given to the phases that a product usually passes through in order to take the form of a finished and final product. It is regarded that an ideal manufacturing system must provide benefits of highly automated and controlled systems and at the same time the production system should also ensure accuracy, mass production, uniqueness of product, and benefits of versatile and adjustable systems. Manufacturing

process is an integral part of the entire manufacturing sector and an important measure of evaluating the performance of any manufacturing sector (Hogan, 2000).

According to Graph 3 below, global lean production has been taking a period of development. The completion of transformation is ranked high followed by system alignment and the creation of new organizations respectively. Building the organizational awareness develops at a slower rate in contrast to other considerations. Kelley (1998) explained the critical importance of manufacturing process within a manufacturing sector and different phases that must be planned, implemented and controlled in an organised manner to assure the success of the entire manufacturing process. This phenomenon is illustrated in Graph 3 below. Thus in order to improve the performance of a manufacturing sector it is an essential requirement to improve the manufacturing process/system by employing different strategies in different areas of the manufacturing process.



Graph 3 - Period for realizing lean production. Source: McGivern and Stiber, 1998.

Fryman (2002) pointed out that in modern times some manufacturing philosophies are attached to the manufacturing process including the TQM, JIT Manufacturing, Lean Manufacturing and CIM. These philosophies have brought many improvements in the manufacturing sector's performance all over the world, although not much in African countries that are substantially less developed.

Koenig (1994) revealed that the rising competition at domestic and international levels is compelling the manufacturing sectors of different countries to focus more on their manufacturing systems (manufacturing strategy, manufacturing process and innovation) so

that they can improve and align their manufacturing process with the global standards and can attain a sustainable level of economic growth and also compete with other sectors at a global level.

The importance of the manufacturing process has been recognized by practitioners as well as by researchers (Slack et al., 2009; Hogan, 2000; Wakil, 1998; DeGarmo et al., 1997) for many years. This has been done along with the passage of time and advent of new technologies and certain new phenomena and concepts that have come along in the manufacturing process and become integrated parts of the manufacturing sector. Thus it is necessary to understand the core issues related to the manufacturing process so that its importance for the manufacturing sector becomes clear. In this regard the following literature review aims to discuss the issues associated with the manufacturing process in depth to explain its importance and significance.

Fryman (2002) explained the basic concept and importance of the manufacturing process that almost each and every manufacturing system has to undergo certain phases and it is necessary for successful manufacturing that all of these phases must be planned well. In this regard the manufacturing management personnel play a crucial role as they have the responsibility to implement the management's planning, manufacturing strategy and to control the entire process of manufacturing to ensure that the manufacturing system works in the desired manner.

The researcher further explained that in different phases of the manufacturing process, management has to adopt policies and strategies as the situation warrants. For example, during the planning phases, management has to look towards several critical issues, among them searching and identifying the potential market for the product. Moreover, in the planning phase, manufacturing management experts also have to take major decisions regarding product design, process for the manufacturing of the products, facilities and equipment that will be needed and the required raw material and allocation of other resources (Fryman, 2002). After the planning phase, the manufacturing system moves towards the next phase, implementation. During this phase, management has the responsibility to assure the availability of all the required resources, labour, material and facilities.

The implementation phase is followed by the controlling phase that requires control of the management over the flow of resources and the entire manufacturing process. In this phase,

it is necessary that management must monitor each aspect of manufacturing and ensure the success of the manufacturing process by maintaining the desired quality and standard within the process in the given time. All of these three phases are identified as the integral parts of the manufacturing process and it is revealed by the researcher that the management must have awareness about the sensitivity and importance of each and every phase so that they can successfully complete the manufacturing process. DeGarmo et al. (1997) identified that the manufacturing process is also about manufacturing a product through different stages and during each and every stage the management of the manufacturing firm must make such arrangements as can work for the success of each phase within the estimated time. At the same time management also has to keep in view that the required standard and quality of manufacturing is also attained throughout the different stages of the manufacturing process.

An additional explanation by this researcher that the manufacturing process or system never ends with the manufacturing of a product that is of great importance. This process continues and the management of the company endlessly looks for ways to improve their product manufacturing. The improvement in the manufacturing process is very important because the demands and requirements of the consumers as well as the market place change very quickly and along with the passage of time the manufacturing firms also have to respond towards these changes by making changes in their product design and process. This change must be supported by the ongoing process of improvement that should be an integral part of the manufacturing system as it assures the success of the products at domestic and international levels. In the same way improvements in the manufacturing process also prepare the background for successful operations of the manufacturing firm for a long period (Dipak and Ata, 2003).

Hogan (2000) observed that the manufacturing process is necessarily conducted with great planning and control and for this it is crucial that the manufacturing system must hire the services of competent technical experts who have relevant qualifications and experience to handle the entire manufacturing system right from beginning to end. There is a necessity for proper and smooth flow of the production process that the people engaged and involved in the manufacturing process must have deep understanding of the technicalities and requirements of the manufacturing process.

Attention should be given not only to conducting each phase on time and to the required quality but also to review the process and to find out the areas where management needs to take steps for the improvement of the manufacturing process. The researcher further explained that the requirement of continuous improvement is attached to the manufacturing process as the improvement in the manufacturing system is also regarded as the integral and initially required part of the manufacturing system (Wright, 2001).

Wright (2001) explained that it is very important that the manufacturing process is understood by the management and supervisors of the manufacturing firms because the success of the manufacturing company depends on how fluently and smoothly the product goes through the different stages to the final product.

Obi (1999) pointed out that during the 1990s some new concepts and phenomena were introduced into the manufacturing industry that gave new meanings to the manufacturing system and as a result the manufacturing process changed radically in a few decades. The manufacturing firms prioritise the implementation and inclusion of new concepts in their manufacturing system because through this they could accelerate their economic growth by making a positive and valuable contribution to production and revenue.

Seymour (1995) pointed out that the need to build the manufacturing system on a sound basis is the basic requirement for the survival of the manufacturing sector. In the stiff global and domestic competitive market place manufacturing companies are required to thoroughly review and analyze their manufacturing system so that they can quickly point out the areas where there is need for making changes or where the manufacturing system requires updating on the basis of the changes occurring in the surrounding world. Koenig (1994) explained that the manufacturing system or process is a wide activity and there are certain areas within it that require the continuous attention of management.

In this regard, there are four important areas where management has to keenly focus to find out the requirements for making changes and improvement. These areas include equipment and facilities, material handling, production methods and labour. If the management succeed in reviewing and analyzing the performance of their manufacturing system on the basis of these four areas then there is a good chance that the entire manufacturing system will progress in a positive direction and at the end the company will benefit in terms of the

success of the manufacturing process that gives stability to the business and will contribute to the economic development of the entire sector and country as well (Koenig, 1994).

Schey (2000) observed that the manufacturing system of the modern era ought to be different from the traditional manufacturing system as the entire manufacturing process is done in a different way through the employment of new machinery, tools and techniques. Thus it is necessary for the companies to keep their manufacturing system updated with advancements in the technology so that they can continue to take advantages of the advent and emergence of new techniques within the manufacturing industry. Thus, there is a prove from the above review of the literature that the manufacturing process should be understood very clearly before reviewing the performance of any manufacturing sector because the manufacturing process adopted by a manufacturing sector lays the foundation for the success or failure of the entire manufacturing industry.

In this regard, it is essential to understand that the evaluation of the manufacturing sector performance must be based on its manufacturing process because the updating and improvement of the manufacturing process is an important issue that plays a significant role in determining the success of the manufacturing sector. It is also explained in the above discussion that the evaluation of the manufacturing system is necessary for examining the performance of any manufacturing system because the manufacturing system or process adopted by the manufacturing sector shows its willingness and responsiveness towards the changes occurring in the processes and that the manufacturing sector is changing according to the requirements of the consumers (Koenig, 1994).

2.3.3 Manufacturing Strategy – Importance and Contribution to Manufacturing

Manufacturing strategy is an important part of the manufacturing activities. The term is basically meant to refer to the decision making issues and problems that the manufacturing companies' management face in their manufacturing practice so that they can achieve their manufacturing objectives by linking the performance measures to their manufacturing activities and functions (Chien and Wu, 2007).

Social scientists mostly agree upon the crucial importance of manufacturing strategy and believe that firms can take manufacturing strategy as a tool of accelerating the growth of their businesses. The following review of the literature is aimed at describing the dynamics of manufacturing strategy and its critical importance for the manufacturing sector so that it

becomes clear why manufacturing strategy is among the manufacturing systems criteria that are chosen as a major measure of manufacturing sector performance of Nigeria (Chien and Wu, 2007).

There has been a steady increase in the production output, which is attributed to integration of advanced technology with routine industrial operations. Chen and Small (1994) observed that manufacturing strategy is an important business activity and that firms are paying more attention to this area after realizing its importance for productivity and the efficient performance of the manufacturing sector. Manufacturing strategy deals with the decisions of management also related to the matter of who and how the resources will be deployed in the production process. This also considers the arrangement and organisation of the necessary infrastructure is to support the activities of the manufacturing process.

Cil (1996) explained that manufacturing strategy evaluation is very important in order to examine the performance of a sector because productivity and efficiency of the sector largely depends upon how the manager organises the related activities through their strategies. Grant et al. (1991) pointed out that many of the companies that have successfully gained competitive advantage during the last few years have secured this competitive advantage through the effective management of manufacturing strategy. The manufacturing strategy is important for businesses because of the assurance of the success of the manufacturing process as part of the strategic strength of a company. This provides companies with "marketing edge through distinct, unique technology developments in it's process and manufacturing operations, which competitors are unable to match" (John, 2005).

Wakelin (2001) pointed out that manufacturing strategy plays an integral part in determining the performance and success of a manufacturing sector because the determination of the long term goals as well as the objectives of manufacturing companies are based on the manufacturing strategy adopted by the firm. The manufacturing strategy also decides what course of action will be adopted in order to achieve the objectives and how all the required and necessary resources will be allocated so that manufacturing companies are able to achieve all of their objectives adequately. The explanation of researchers that manufacturing strategy is a broad term that covers a wide range of decisions and policies that the management has to take to assure work is conducted correctly for the attainment of their set objectives.

Baker and Sinkula (1999) explained that manufacturing strategy basically requires management to take major decisions regarding some of the key issues. The first and most important issue is to define their activities, type of manufacturing products and the methods of manufacturing. Management also has to decide how they should adopt the strategies through which the entire manufacturing process will contribute to the competitive advantage of their business.

Beise and Stahl (1999) clarified that manufacturing strategy is nothing new for the manufacturing sector and one might trace the roots of manufacturing strategy to the Harvard Business Review article, "Manufacturing - Missing Link in Corporate Strategy" by Skinner in 1969 (Cited in (Skinner (1985)). In this article the writer suggested that the supervisors of the manufacturing system must adopt a top-down strategy in their business operations. In this regard the writer raised an important point that the manufacturing objectives of a company must be derived from the business objectives so that the manufacturing policies can effectively work for the attainment of these objectives.

Skinner (1985) observed the concept and objectives of the manufacturing strategy in detail. Skinner explained that manufacturing strategy can be understood as a broad array of activities that range from different structural as well as infrastructural decisions that are taken by the management of a manufacturing firm with the intention of determining the capabilities of their manufacturing system. Moreover the manufacturing strategy also decides how the manufacturing firm will operate and arrange the resources so that it can meet the set of manufacturing objectives that are set in the light of the business objectives of the company.

Generally the objectives of the manufacturing firms surround issues of cost, quality, delivery and flexibility. Along with the attainment of the objectives manufacturing firms also remain concerned about the trade off between these objectives. In short, manufacturing strategy can be understood as the strategies and policies of the manufacturing sector that revolves around the following five key areas: “Plant and equipment, production planning and control, labour and staffing, product design and engineering; and organisation and management” (Skinner, 1985).

Thus it became very clear that in defining manufacturing strategy it is critical that the company must focus upon the above mentioned five areas as these are identified as the main areas of concern for the manufacturing strategy developers. The identification of key

five areas of manufacturing strategy provided the basic idea about the boundaries and intentions of the manufacturing strategy. Baptista and Swann (1998) threw further light on the concept of manufacturing strategy and explained that manufacturing strategy is all about the coordination of the objectives and actions of a company applied within the functions of the manufacturing sector. The main intention of this coordination is the attainment of the medium as well as long term objectives of the firm.

The main intention of manufacturing strategy is also to bring the manufacturing company into the position where it can compete well with the domestic as well as foreign firms. It is necessary that the manufacturing strategy must work to match the production system of the company with the requirements of the market place. In this regard the manufacturing sector must work to take up the functions and activities of the manufacturing companies that can take the manufactured products to the international level and satisfy the requirements of the consumers and global markets (Baptista and Swann, 1998).

Tidd et al. (2001) highlighted some of the key areas that must be demonstrated by the manufacturing strategy of a firm. In this regard it is necessary that the manufacturing sector must address the key issues including manufacturing capacity, production facilities available, the use of appropriate and up-to-date technology and techniques, assuring the quality of the finished products or services, planning of the production process and control over the material availability and the organisation of the workers as well as personnel of the manufacturing company. Brynjolfsson and Hitt (2003) clarified that manufacturing strategy is regarded as the heart of the manufacturing sector as the performance and activities of the manufacturing firm depend upon manufacturing strategy. Thus it is necessary to examine manufacturing strategy of the whole sector to make some predictions about the future of that sector.

Becker and Dietz (2003) threw light on some additional and important issues that are associated with manufacturing strategy. The researchers revealed that a decision about the geographical location of the manufacturing unit of the company is one of the most important issues considered by management when they start designing their manufacturing strategy. In some cases if the company opts to manufacture their products at their traditional manufacturing plants then they may have to spend more on labour and materials etc. but if they select another site where they can find cheap labour and raw materials, the company can complete the manufacturing process more cheaply.

Freel (2003) observed that advancements in technology are compelling management to make some revolutionary changes in their manufacturing strategies. Due to advancements in information and communication technology, there are new concepts emerging in the global market place like e-commerce, outsourcing etc. and the manufacturing firms also have to respond to the emergence of new concepts in the business world.

Manufacturing companies must have deep insight into accessing suppliers from all over the world so they must choose suppliers who can provide good quality of raw materials at competitive rates. In the same way, companies also go for outsourcing of certain activities and can give partial control of some of their manufacturing process as to the workforce of some other country or other company. In this way they can benefit from the expertise and skills of the workers belonging to different countries and companies (Becker and Dietz, 2003).

However, the companies have to ensure that there will be no compromise over product quality and in this regard the right decisions about outsourcing are an important factor that can affect the future performance of the manufacturing sector. Thus the importance of the manufacturing strategy becomes clear from this perspective as well as revealing that there are different types and areas of decision making that come under the umbrella of manufacturing strategy – all possessing the capability of affecting the performance of the manufacturing sector to a greater extent (Slack et al., 2009).

Galende et al. (2003) explained that manufacturing strategy has direct effects on the performance of the manufacturing sectors because there are some key features and attributes of the products and services that came into existence as a result of the manufacturing strategies. Now with coming of the internet, it is a fact that most consumers are more demanding because they have the opportunity to make their selection about certain products or service after getting access to information about the many products available at different shopping places with different innovative features. In such a challenging situation manufacturing companies have to portray their product in front of the consumers in such an attractive manner that they are influenced to buy it.

For influencing consumer behaviour it is necessary that the product or service must offer some unique features and functions that can catch the attention of consumers. The availability of such features in the product or service is the key decision that is taken by the

management while designing their manufacturing strategy because the success or failure of the product on the basis of its features and functions also results from the manufacturing strategy (Galende et al., 2003).

Kermally (2002) observed that the right manufacturing strategy can help the manufacturing company in aligning with technological advancements. Manufacturing strategy also decides what technology, devices and techniques are adopted by the company in the process of manufacturing. If the manufacturing strategy suggests appropriate and updated techniques and devices then the output of the manufacturing company will also be aligned with technological advancements. On the other hand, if the manufacturing strategy directs the manufacturing company to remain stuck in their traditional methods and tools then there is a great possibility that the end product may not be of the global standard and at the same time the product may not be regarded as technically sound.

Kremp et al. (2004) observed that global competition and rapid technological advancements are compelling the manufacturing sectors to design such manufacturing strategies that can help them in meeting the challenges of the technology-driven and highly competitive market place. The researchers foresaw that many of manufacturing sectors will be compelled to adopt such manufacturing strategies in the coming years that can assure low cost of production along with high performance and quality of the product or service. This can as well aid the attainment of these objectives that manufacturing such products through utilization of their old and traditional methods and machinery is required to make rapid changes in their manufacturing process. This consequently introduces different advanced technologies in their manufacturing units like programmable automation and flexible robotics.

The introduction of such technologies through manufacturing strategies can result in the increment of manufacturing flexibility and at the same time the manufacturing companies are able to quickly respond to the rising demands of the competitive markets while they have to spend less due to cost effectiveness of the advanced manufacturing methods and machinery. Freel (2003) further explained that manufacturing companies operating in different types of products are giving much importance to manufacturing strategy because it's critical importance for the success of the entire manufacturing process is realized by most of the experts and specialists operating in the manufacturing field.

Manufacturing strategy is all about making decisions and plans related to three major issues (Freel, 2003). The first issue is about the method or process of manufacturing.. The second issue is related to the allocation of resources in order to complete the manufacturing process. The third issue is related to the infrastructure to support the manufacturing process – how the company will assure the provision of required infrastructure in an adequate manner so that the manufacturing process can be carried out in a smooth way. These are the three basic issues in front of management when designing the manufacturing strategy. However it is a fact that the manufacturing sector has become a much wider term and the companies have to focus on several other important issues like outsourcing, workforce arrangements, technology adaptation and techniques and device selection.

Manufacturing strategy revolves around major decisions that management has to take related to process, allocation of resources and availability of infrastructure. Along with these key issues manufacturing strategy has to cover some other important issues such as geographical location and also decisions that the company has to make whether to outsource some activities. It becomes clear that manufacturing strategy possesses the capability to strongly affect the performance and success of a manufacturing sector. For this reason manufacturing strategy is also among the measures that will be analyzed to examine the performance of the Nigerian manufacturing sector.

2.3.4: Manufacturing Innovation - Importance and Contributions

Innovation is an emerging critical issue for the manufacturing sector that could be defined as "the radical as well as ncremental changes in thinking, in things, in processes or in services" (Chesbrough, 2003). Sethi et al. (2001) holds the opinion that innovation is a creative strategy and for efficient performance of the manufacturing sector in the highly competitive market place it is necessary that the companies focus on the innovation of design so that their products can generate high revenues and the overall performance of the sector could be improved.

There are several research studies conducted by different researchers to understand the importance of innovation in the manufacturing sector and to study the impact of adopting innovation on the performance and profitability of a company. It is disclosed from the results of most of the studies that innovation has become a must for the manufacturing sector and now companies have to focus on innovating products rather than just designing

them in order to catch the attention of the consumers and to increase their sales revenues (Kremp and Mairesse, 2004).

Rothwell (1992) concluded that innovation has an important role to play in the manufacturing sector and to evaluate the performance of any country's manufacturing sector performance it is necessary that one must look critically at and review the innovation of products and design adopted by the companies of that sector. Soderblum and Teal (2000) conducted an empirical study to analyze the technology adoptability, importance of technical and locatable efficiency in the African manufacturing sector and selected Ghana for conducting the research.

Their study found that the foreign operated firms in the country are efficient with respect to the usage of technology and the local owners put less emphasis on technological developments. Due to this fact the manufacturing sector of Africa is not uniformly progressing and some of the firms are performing better from the perspective of technology, innovation and strategy whereas many of them are lagging behind. The researchers concluded that there is a need for awareness among management of the local manufacturing companies so that they can go for adoptability of technology and innovative techniques within their firms so that the performance of the manufacturing sector of Africa can be improved (Sethi et al., 2001).

De Propris (2000) concluded that in the twenty-first century there is a great challenge ahead of the manufacturing firms, which has to be more innovative and creative as well as responsive to the global market. This consequently justifies their existence in the highly competitive market and can also work for the economic stability of the country. The researcher pointed out that innovation has become so critical for manufacturing firms that in some countries there is a great threat to the manufacturing sector that does not practice the concepts of innovation.. The companies have to face tough competition in order to advance new features for their products and services to generate value for the consumers. Innovation has appeared as an integral activity for the manufacturing companies and it is also proven that by adopting innovative strategies and product designs, a firm can play a vital role in attaining sustainable growth for a country.

Ahuja (2000) pointed out that the importance of innovation adopted by the manufacturing sector can be understood by the fact that consumers have great interest in the activities and strategies of manufacturing companies, especially those associated with consumer products

and also want to see new strategies and policies after short time intervals to confirm that manufacturing firms are responding well to the environmental changes and updating their production process according to technological advancements.

Consumers ideally have such great trust in the performance of the manufacturing companies that they consider them as the future creator of economic growth in the country and the manufacturing firms can maintain this expression only if they can maintain the attention and loyalty of their consumers towards their products by providing updated and unique products or services. In this context the demand for innovation is at its peak at a global level and the manufacturing sector all over the world is looking for the latest technology usage, capital, creative skills and related services that can assist these companies in innovating unique ideas for their products and services that can finally work for the stability of the company, the manufacturing sector and the entire economy of a country (De Propris, 2000).

Ahuja (2000) revealed that where globalization has made a significant impact in each and every facet of human life and business, the manufacturing world is also witnessing these changes and as a result it has become necessary for the companies operating in the manufacturing sector to prove through their output that they are capable and deserving enough to stand among the other firms in the global competitive era as they can offer consumers products and services with innovative features and functions.

Due to this fact the manufacturing sector is going through a phase of transformation where each and every strategy and process of manufacturing is directed by the motive of innovating new and unique ideas, concepts and designs for products and services. In this regard the role of research and development has an important role to play and the manufacturing companies are largely hiring the services of the scientists and engineers who can conduct the background studies to assist the company in generating innovative ideas for products and services. For this purpose manufacturing companies are also compelled to invest a considerable amount in research and development related activities (Alli, 2008).

Belderbos (2001) pointed out that the increasing importance of innovation in the manufacturing sector is backed by some important issues and elements including "modelling and simulation, nanotechnology-based materials, adaptive supply networks, customer knowledge sharing, on-demand customization, shared use facilities for R&D and prototyping, complex numerically controlled tooling and advanced CAD/CAM" and so on. It is very important to keep in view that the manufacturing firms have to concentrate a great deal on

the above mentioned technologies and concepts so that they can draw benefits from the emergence of the relevant technologies and can take control over the labour costs and cost of the product. In this way the manufacturing firms can easily compete with foreign firms by minimizing their production costs and wages expenses.

At the same time the appropriate usage of technology and advanced tools have a significant impact on products or services that can result in an increase of sales revenue. Darroch and McNaughton (2002) pointed out that innovation is not a tangible thing that a company can bring in to its business by utilizing certain technology or machinery. The manufacturing sector must understand that in order to be innovative, they have to make revolutionary changes, and according to requirements some structural changes, in their patterns of working.

The manufacturing firms are essentially required to keep themselves updated with the advancements occurring in their surrounding so that they can be aware of all the new techniques and advancements that they can avail themselves of in order to make their manufacturing activities more advanced, up-to-date and efficient. In this regard it is important that the manufacturing companies realize the importance of the collaboration between different components of the economy (Darroch and McNaughton, 2002).

There should be collaboration between industry, customers, suppliers, researchers and government so that all of these players can work with each other and also share the risk, time and cost that is required for the development of any new technology. This collaboration can also ensure the integration of the new design and techniques in a modular fashion that will enable manufacturing firms to adopt new technology in a convenient manner. Along with the collaboration it is also necessary that there must be adequate investment in the manufacturing sector. In this regard the companies operating in the sector, the government and the finance providers must make the arrangements for the investment in the workforce as well as in the organisational and financial models (Darroch and McNaughton, 2002).

The adaptation of new technologies along with collaboration and investment in human and organisational matters can enable a firm to provide such products to the consumers that can assist the company to compete at an international level. Baldwin and Johnson (1996) highlighted some important issues that can work for bringing innovation into the

manufacturing sector. The researchers highlight that the manufacturing sector must look for opportunities through which production capabilities of the sector can get access to overseas locations.

When the designers and the experts of one manufacturing sector work along with the experts of another country, that country ideally should be higher in manufacturing quality, then there is great scope for innovative ideas as well as technology adopted by the overseas country's manufacturing sector to be shifted into the home country's manufacturing sector and the companies operating at a domestic level will acquire many new ideas related to the innovation of products and services. In the same way the workforce of the manufacturing sector will get the opportunity to received training in the manufacturing process in other countries and as a result there will be improvement in the skilled level of the manufacturing workforce (Darroch and McNaughton, 2002).

In this way overseas access to the technologies and training opportunities can benefit a country in so many ways. If a country has decided to conduct all necessary arrangements that can bring innovation in its manufacturing sector then it is necessary that they must focus on getting access to the manufacturing sectors of other countries because in this manner they can shift technology, skills and techniques in their own country that can help them in innovating new products and services. This will also help manufacture the products at an international level because a closer look at the international products will enable them to add new features in their own products (Koren, 2010).

Ahuja and Katila (2001) pointed out that innovation requires manufacturing companies to give up their traditional methods of manufacturing. The manufacturing sector must accept the reality that they have to discontinue using their old manufacturing and business models because the modern era requires new ones. The business models of the modern world must work for the integration of services, manufacturing design, and manufacturing stages so that the entire process of production can be managed in an effective manner and the sector can produce valued products and services for the consumers all over the world. Innovation in the manufacturing sector will also be reflected as well as supported by the fact that manufacturing companies operating are proficient in the usage of different software and communication technologies.

At the same time the manufacturing companies should also conduct their routine business and manufacturing activities through the usage of computer devices and sensors so that the entire manufacturing system can work in an efficient and advanced manner. The developing countries are focusing a lot on the usage of computing technology and devices in the manufacturing process and the countries lagging behind in the development process must realize that they can walk along with the developing and developed nations only when they adopt advanced computing techniques and devices and implement them within their manufacturing system (Darroch and McNaughton, 2002).

Neglecting computing skills and devices within the manufacturing sector is a great barrier to the growth of any manufacturing sector in the technology driven market place of today. Thus it is necessary that the manufacturing companies must follow the computer usage patterns of the developing countries so that they can also adopt those patterns in the manufacturing sector and be in a position to produce products and services of the same standard and quality as those of the developing countries (Ahuja and Katila, 2001).

Cefis and Orsenigo (2001) observed that some countries are facing problems in coping with the technological advancements and their manufacturing sectors are also not performing well enough to be evaluated at an international level. The researchers pointed out that one of the main reasons behind the failure of the manufacturing sectors is that they are lagging behind in the usage of advanced software. It is a fact that in the modern era if any manufacturing company or sector ignores the importance of computer software and devices or due to some reason there is lack of software interoperability, then there are more chances that will not be able to compete with others at a global level. At the same time the products designed by the company will not be updated and be efficient enough to meet the demands and expectations of the domestic consumers.

Thus it is a fact that lack of computing technology adoptability is a great barrier that hinders innovation in product manufacturing and as a result the manufacturing sector remains inefficient and less productive. Anselin and Varga (1997) explained that the on-going advancements in technology are compelling the manufacturing sector to be more advanced and innovative so that the changing demands of the consumers could be successfully met. The researchers observed that the small and medium enterprises are in more need of adopting technology to bring innovation in their activities. The reason behind this need is that in most of the countries there are considerable portions of the workforce employed by

the SMEs and these SMEs also have a major share in the overall productivity of a country. Thus, being a major portion of the production unit of a country, it is necessary for the SMEs to adopt advancements in technology so that they can bring necessary changes in their functions and activities and meet the coming challenges of the new millennium.

Diez (2000) revealed that if a manufacturing sector intends to become strong and competitive then it is necessary that it must have the support of some factors. Among these factors technology adoptability is important. It is important that labour must be skilled enough to deal with advanced technology. Most experts believe that the performance of the manufacturing sector is the backbone of the economic development of a country, thus countries have to focus on improving the performance of their manufacturing sector. Improvement in the performance of the manufacturing sector can be made by introducing innovative ideas throughout the manufacturing process and for this the usage of advanced technology is an essential requirement.

Adequate research and development also supports innovation in the manufacturing sector so the countries must make some arrangements for R&D work related to the manufacturing sector so that the result of the research work can assist the manufacturing firms in innovating new concepts and ideas for their product design and manufacturing process. This fact must be realized by the manufacturing sector related professionals and there is a great need for fresh through innovation..

Beneito (2003) pointed out that the manufacturing sector plays an integral role in the economic development of countries and necessary to keep a keen eye on the issues and factors that can influence the performance of the manufacturing sector. The researchers pointed out that in many of the countries there is an observation that the innovation of new product designs, manufacturing process and strategy plays an influential role and affects the performance of the manufacturing sector to a great extent.

This fact explained very well that for the survival of any manufacturing sector it is essential that there must be a thrust for innovation as it is one of the critical factors that can assist competitiveness in the industry. While keeping in view the importance of innovation, it is necessary that steps should be taken at a national level and there must be formulation of such policies that can promote innovation in the manufacturing sector. The government must take some steps for the promotion of training and skill development of the workforce

so that they can become technologically up-to-date and can bring innovative ideas into the manufacturing sector Beneito (2003).

The above review of the literature explained in detail the importance of innovation for the manufacturing sector. Some other researchers such as (Beugelsdijk and Cornet, 2002; Archibugi et al., 1995; Bagchi-Sen, 2001; Bharadwaj and Menon, 2000) have also explored the importance of innovation in the manufacturing sector and found that there are strong relationships between innovation, profitability, high performance and efficiency. Academic writers explained in detail the role of innovation for the successful survival of a manufacturing sector. The above discussion also throws light on the need of putting innovation among the measures of the performance of a manufacturing sector and it becomes obvious that negligence of innovation is a critical mistake that can lead to a low level of performance.

Thus to evaluate the performance of the Nigerian manufacturing sector, innovation is also an important measure as it is found that the sectors succeeding in innovation are successfully surviving and competing at the international level but the sectors ignoring these emerging and important factors are lagging behind the others in performing well at domestic and international levels and to meet the increasing demands and expectation of consumers (Bharadwaj and Menon, 2000).

2.3.5: The Impact of Environmental Uncertainty in Manufacturing

Environmental Uncertainty refers to such situations as when the management of a firm faces some major difficulties in order to take decisions related to their future activities and functions because they have a very unclear picture in front of them as they have very little information related to the external environment. When due to any socio-political or economic issue the business scenario of any country becomes unpredictable and in flux, then business firms operating in the country also become uncertain about their future and their normal operations are affected due to the fact that they are not in a position to take decisions about the company activities that need stable environmental conditions. When such a situation is encountered by business organisations they face challenges in making their decisions, solving business related problems, designing their strategies and deciding the management and leadership issues and subjects (Evangelista, 2000).

Fagerberg (2004) explained that environmental uncertainty is that condition when business managers of businesses do not have sufficient information about the environmental factors, due to which they remain unable to understand or predict the needs and changes required in the environment. For the manufacturing sectors environmental uncertainty refers to uncertainty in the economic, socio-cultural, technological and legal environment that hinders the management in taking effective action for the business and as a result the entire productivity and revenue of the manufacturing sector is badly affected.

In this regard, it is necessary that the manufacturing companies must be equipped with such skills that can help them in adopting and responding to the rapid changes occurring in the environment. Olukemi (1993) conducted research to find out the relationship between environmental uncertainty perception and environmental scanning behaviour of the CEO of 47 manufacturing firms operating in Nigeria. The research was intended to find the role of the environmental uncertainty in the performance and development of the Nigerian manufacturing sector. It is revealed from the research that perceived environmental uncertainty plays a vital role in determining the performance of the manufacturing companies of the countries and both the economic and political legal sectors of the environment used to be salient for Nigerian manufacturing executives.

Sabherwal (1999) conducted an empirical study in order to find evidence about the relationship between environmental uncertainty and business performance. The study came up with the conclusion that uncertainty within the environment has a strong impact on businesses and it affects several strategic operations and planning of the company. The strategic implications of a business highly depends upon the stability of the environment and when management face an unpredictable situation led by environmental uncertainty then the strategies and planning of the company failed to progress as desired.

The stability and certainty in the environment helps the companies to be competitive and survive even in challenging situations. Thus the relationship between the performance of a business and environmental uncertainties are found to be strongly negatively related to each other. The rise in environmental uncertainty declines with the performance level of the firms whereas certainty and stability in the environment work for the better and high quality performance of a business (Sabherwal, 1999).

Amit (1993) conducted an empirical study to measure the impact of environmental uncertainty on the SMEs' functions, their performance and product designs. He selected the existence of "dynamism, complexity and hostility" in the environment as measures of environmental uncertainty and analyzed the employment data of the Scottish and Northern English SMEs. Both manufacturing and service firms were selected to find the evidence about the impact of environmental uncertainty on the performance of each of these types of firms. It was found that service firms and manufacturing firms encountered the effects of environmental uncertainty in different ways.

The results related to environmental uncertainty on manufacturing firms show that when manufacturing companies face uncertainties related to the functioning of their suppliers then their manufacturing process as well as their level of innovation is strongly affected in this way. It is proved that environmental uncertainty can prevent the product design innovation process and in order to assure the high quality and innovative performance of the manufacturing sector, the responsible forces must work to assure environmental certainty so that manufacturing companies can carry on their product design and other activities by expecting predictable results and the economy can also get support from productivity and the innovative product designing of the manufacturing companies.

Selto et al. (1995) threw light on some of the negative effects that environmental uncertainty can draw upon the businesses, in particular on the manufacturing firms. It is explained by the researchers that when uncertainty existed within the surrounding environment, then the management of manufacturing companies found that they lacked sufficient information about the environmental factors and as a result they were not in a better position so that they could make predictions about their emerging needs due to the changing environment. It is necessary that companies must have adequate information about their surroundings so that they can foresee their requirements in case of any environmental changes but when insufficient information about their surroundings prevents them from making such predictions, then the overall performance and strategic decisions of the firms can be badly affected.

The environmental factors like pollution, legal issues, social instability and complexities have the capability to influence and affect the operations of manufacturing firms and the management is supposed to develop strategies and plans to counter any of these problems. However, management must have deep insight over the entire situation because a clear

understanding of the environment can enable them to develop such plans that can work for the manufacturing firms in case of any environmental problem. When management lacks information then the plans and policies may not be designed adequately to safeguard the manufacturing firm in any problematic situation and ultimately the performance and work quality of the company can decline. In this way the researchers explained the negative consequences of environmental uncertainty over the performance and work quality of the manufacturing companies.

Black (1994) observed that the managerial qualities and skills of the manufacturing sector personnel can play an important role in determining the extent to which environmental uncertainty can affect the performance of the manufacturing company. In this regard, there is great importance that managers make some arrangements that can inform them as to any such environmental changes that can affect their functions and activities. For this it is necessary that the manufacturing companies must have adequate information and understanding of their surroundings and that they are in a position to predict any change that might occur in their environment. If the management succeeds in making predictions about the expected changes in the environment there will be very easy for the manufacturing company to cope with the challenges resulting from those changes as they can design suitable strategies that can work to prevent the negative affects of those expected environmental changes.

Miller (1996) pointed out that environmental uncertainty can be handled in an effective manner if management makes changes in the functions and activities of company so that the negative effects of the uncertainty could be minimized. It is important to understand that changes occur in the environment very rapidly and the manufacturing sectors have to be prepared to face these changes; they should also be ready to make any structural or functional changes in their business. In this regard manufacturing companies also have to work towards integration and collaboration with different components of the market place so that this can help face the uncertainties of the environment.

The formation of different alliances, umbrella organisations and other forms could be a helpful step for the manufacturing sector because through these form they can share information with each other and as a result they can form better policies and strategies that can help in case of any uncertain conditions. The manufacturing companies individually cannot secure as much information as they can secure and share at common form so steps

must be taken for the unity of the manufacturing sector where different ideas and information could be shared and the negative effects of environmental uncertainty could be reduced. For this purpose legal alliances and joint ventures can also work for the improvement of the situation (Miller, 1996).

Russo (1997) observed that it is very important for the manufacturing sector to keep an eye on environmental factors because it is regarded as a highly dynamic environment and different components, parts and materials used in the manufacturing process are at higher risk of seeing the impact of any change occurring in the environment. The changes in environmental factors might result in changes of demand and supply patterns of any raw materials at domestic or international level and the manufacturing companies have to be prepared to make changes in their demand and supply patterns in such a way that they can respond to the changes occurring in the domestic or global scenario. For this reason, manufacturing companies must be flexible enough in such a way that they can make changes in their manufacturing process and strategy so that they can manage with the changeing supply patterns of the raw materials and can still sustain their regular manufacturing operations and activities to the same quality and standard.

Brown and Hicks (1995) explained that the flexibility of manufacturing companies has a major role to play in the situation where the manufacturing sector faces environmental uncertainty. When there are some changes in environmental factors closely linked with the manufacturing industry, then the manufacturing operations are likely to be influenced by these changes. If a manufacturing firm has developed such strategies that make the company flexible with respect to its demand and supply requirements, then the company can easily face these changes, whereas lack of flexibility can cause several problems for the company and their routine manufacturing activities can also be badly affected.

Teo (1997) observed that there are many cases found in the manufacturing sector that clarified the effects of environmental uncertainty on manufacturing companies. In particular, product design and innovation can be badly affected due to environmental uncertainty. The researcher explained that environmental uncertainty can affect the manufacturing sector in terms of dynamism as well as heterogeneity. In both cases routine operations and activities of the manufacturing company are disturbed and the innovation process also faces certain barriers due to which overall innovations in the product designing go on declining.

Zviran (1990) explained that the manufacturing sector has to remain in direct interaction with the surroundings for the supply of raw material and facilities for the provision of finished products. During this entire interaction there are certain opportunities and threats that are transferred to the manufacturing companies from the environment; in order to face these threats in depth information and understanding of environmental issues is necessary for the manufacturing sector. In case of lack of detailed information the decision making process of the manufacturing sector is affected and the performance of the company can decline (Teo, 1997).

The review of the research studies presented above explained in detail the issue of environmental uncertainty in connection with manufacturing sector performance. It becomes clear that the manufacturing sector sees the direct effects of environmental conditions because due to the nature of its work, the sector remains in interaction with the environment for getting different raw materials and facilities. Due to this interaction the threats of environmental uncertainty are also higher for manufacturing companies and the most effective way to overcome these problems is to have deep and clear understanding of the surrounding environment (Slack et al., 2009).

For this reason, management has to have adequate and detained information about the environment in which they operate so that they can design strategies to face the changing environmental conditions. The above discussion also explained that environmental uncertainty has direct effects on the performance of the manufacturing sector and thus it is very important to evaluate the performance of the Nigerian manufacturing sector in terms of environmental uncertainty (Zviran, 1990).

2.4 CHAPTER SUMMARY

This chapter examined several publications associated with the manufacturing sector from the global perspective. Studies on the manufacturing sector looked at the impact of technology on the manufacturing and the consumer goods manufacturing especially the fast moving consumer goods. This chapter explored a number of measures of manufacturing performance, including manufacturing strategy, manufacturing process and innovation, product design and environmental uncertainty.

The chapter gives brief chronological history of the manufacturing process from World War 11 period to the modern industrial society. This follows the adoption of different management philosophies in the manufacturing process such as Just-in-time practiced and

Total Quality Management. These two philosophies have been integrated and strive to minimise production defects and their causes (Brown and Hicks, 1995). In addition, manufacturing processes have seen the adoption of advanced manufacturing concepts and technologies in the production process such as computer-integrated manufacturing systems. All these are aimed at maintaining low cost manufacturing products, high standard and quality as well as high level of flexibility in the designing and management of manufacturing works.

The above review of the literature provided understanding of some of the crucial issues associated with the research topic. The study revealed that the manufacturing sector is an important part of the business and one of the most important victims of technological advancements. In the modern era certain new concepts and philosophies emerge in connection with the manufacturing process and manufacturing companies are required to update and restructure their manufacturing processes in response to the changes occurring in the surroundings. The above literature review also clarified the importance of factors including product design, manufacturing strategy, innovation and environmental strategy for the efficient performance of the manufacturing sector and provided the basis for examining the performance of the Nigerian manufacturing sector in terms of these factors.

The chapter also examines the consumer goods manufacturing. Over the recent past, the world has witnessed escalation of the fast moving consumer goods (FMCG) in the global market. This is attributed to the volume of sales and amount of profits generated by these types of products. FMCG have become a very significant part of the manufacturing sector and for many decades they constituted a large percentage of the manufactured goods.

Consumer goods manufacturing has also witnessed the impact of the advanced technology to a larger extent. However, manufacturing of the fast moving consumer goods poses enormous challenges to manufacturers. Consumer awareness is increasing day by day and this means that manufacturers have to put more effort in developing products that meet consumer demand and expectations. This means also that fast moving consumer products face a very short life cycle. Manufacturers have to bear substantial amounts of money in research and marketing of newly developed products.

The discussion threw light on the overall importance and contribution of the FMCG but the above studies did not explain how the underdeveloped countries can cope with the emerging challenges of this field and what strategies and polices will help them in gaining

economic development through FMCG manufacturing. Thus a gap is found in the literature and this research study strives to fill this gap by identifying the factors that can help underdeveloped countries like Nigeria to maintain a high standard of manufacturing, especially in the FMCG sector.

The chapter pointed out the importance of the manufacturing sector to the economic growth and development. To achieve its full potential, this sector of the economy has no choice but to adopt advanced cost effective technology. Technology not only improves the performance of large-scale enterprises but also the small and medium enterprises engaging in the manufacturing business. However, the literature reviewed in this chapter leaves a huge gap on the socio-economic impacts of the adoption of these technologies. It is apparent that such technologies can results to loss of jobs by many workers who previously were employed. Technology can have serious repercussions on the welfare of the surrounding populace. The reverse can only be true with the adoption of labour intensive technologies.

Some gaps in the literature identified after reviewing the above mentioned research studies, found that a number of very important issues associated with the above topics remained unanswered in the above studies. Examples include how advancements in the manufacturing sector demand changed the role of countries and how countries, especially underdeveloped countries, have copes with these changes when facing certain challenges and limitations due to their socio-political structure and poverty issues. The research study strived to fill the gaps found as a result of the review of the above literature. These gaps have further stressed the importance of finding the answers to the research questions that are also identified in the beginning of the thesis in the light of the objectives of the research study.

CHAPTER 3

REVIEW OF THE NIGERIAN MANUFACTURING SECTOR

3.1 INTRODUCTION

This chapter presents a review of the research studies that were conducted during different periods to evaluate and examine the performance and growth of the manufacturing sectors of different countries including Nigeria, India, Malaysia and China. The researchers have taken different approaches for the examination of the performance of these sectors. The research study is based on the analysis and examination of the Nigerian manufacturing sector and compares it with the manufacturing sector of other developing countries. To conduct the comparative analysis, the information about the manufacturing sectors was mainly collected through the review of the literature. In the first chapter of the literature review there was a detailed explanation of the importance and contribution of the performance measures selected for the analysis and the role of the manufacturing sector in economic development.

This chapter specifically focuses on the Nigerian manufacturing sector, India, Malaysia and China and it presents a detailed account of information about developments policies, problems and limitations of the manufacturing sectors of each of these countries in the light of the research work done so far. This review is not only intended to describe the performance of these manufacturing sectors but also to find the gaps in the literature so that the study can be focused on filling these gaps.

3.2 THE NIGERIAN MANUFACTURING SECTOR

While discussing the Nigerian manufacturing sector, it is very important to understand its entire basic economic structure. Nigeria depends largely on oil for its export and this dependence has a significant impact on other sectors. To effectively study the manufacturing sector then, it is necessary to study the role of the oil sector and its corresponding effects. Thus, the review of the studies related to the Nigerian manufacturing sector performance is led by the study of the oil-based economy of Nigeria (Ayanwale, 2007).

3.2.1: Nigeria – An Oil-Based Economy

The Energy Information Administration (EIA) reported that Nigeria is the 11th largest producer of crude oil with a production output of 2.5 million barrels of crude oil per day as of December 2006, and it is among the influential members of Organisation of Petroleum Exporting Countries (OPEC) (EIA, 2007; Ayanwale, 2007). Because of this, the oil price decline affects the economy of Nigeria considerably; and in turn, also affects country's economic activities such as working conditions and productivity (Modibbo, 2003; Kubeyinje and Nezianya, 1999).

A study by Hogan (2000) revealed that since the entire economy of Nigeria depends on oil revenue and the country has very large oil reserves, it has a great potential to build a strong and vibrant economy simply on the basis of huge oil revenues. Unfortunately, oil revenues failed to improve the poverty level of the country and it was among the world's poorest countries until 2002 (Adeolu, 2007). The researcher pointed out some of these main reasons for this failure.

Hogan (2000) observed that while the Nigerian government did set the target for some reforms related to spending, inflation and privatization, very few of these reforms were actually put into practice and as a result the International Monetary Fund (IMF) discontinued the stand-by credit agreement with Nigeria. Hale (2002) also stated that political instability and corruption further hindered the development of the economy. The researcher then concluded that in order to accelerate the growth of its economy, Nigeria should reduce the level of oil dependency and concentrate on the development of other sectors like agriculture, energy, transport and manufacturing.

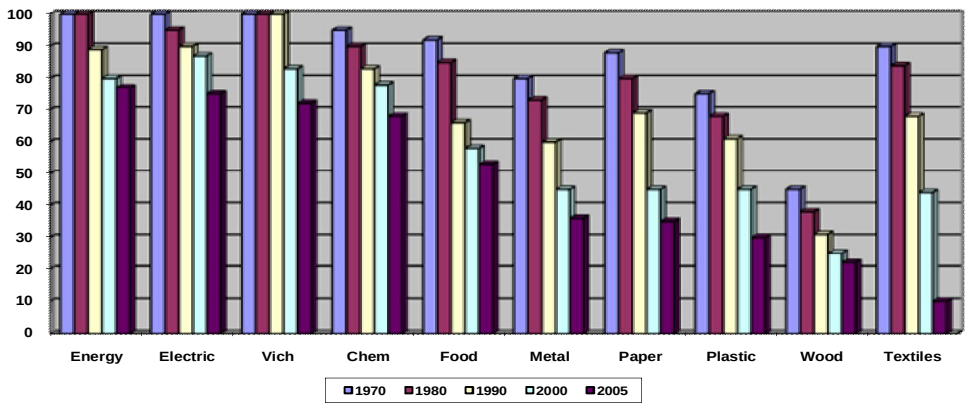
Obadina (1999) also concluded that the country possesses great potential to prosper economically on the basis of its huge oil reserves. He also stated though, that due to its management legacy the country still faces some major problems like inadequate infrastructure, high level corruption and inefficient deployment of resources. Oil, rather than being the blessing for the country, it has become a major source of debt. Due to fluctuations in the oil prices in the global oil market, there is a burden on the country as it has to pay a large amount for its import bills (Adeolu, 2007).

In another study, Rankin et al. (2002) observed that when there was boom in oil prices during the 1970s, the country committed the serious mistake of neglecting other sectors like agriculture, mining and micro, small and medium manufacturing. At that time the country was earning enough from crude oil exports that could have been used to develop other

sectors; yet these other sectors were ignored because of dependence on this very income. There were also other factors that precipitated the decline of particular sectors. For example, from 1970 to 2005, many foreign countries expressed interest in the manufacturing businesses in Nigeria such as steel, wood, food, electronics, chemicals and vehicles sub-sectors among others. But due to regulations and other restrictions, need for capital and expertise, only a few companies were able to establish a significant presence in those sectors.

However, a number of those foreign companies that were able to establish joint ventures with Nigerian companies were substantially large. As such, some sectors such as fuel refineries, electronics, chemicals and vehicles have seen a substantial foreign ownership and product output growth over the years as shown in Graph 4 while those of others declined, such as textile, wood and plastics. The main difference in the interests of the foreign firms in the industries came from legislation and restrictions to enter the market (Mazumdar and Mazaheri ,2003).

Graph 4 shows the ownership of various manufacturing sectors by foreign investors, which covered a survey between 1970 and 2005. Since the research was based on the data between 1985 and 2009, there has been a reduction in ownership of manufacturing companies by investors. For example, the energy sector, chemical sector and textiles industries. This implies that Nigeria is adopting the culture of its direct investment in a bid to reduce the amount of money repatriated to other countries by foreigners.



Graph 4: Percentages of Share of Output of Foreign Owned Manufacturing Firms in Nigeria

Source: Constructed from Data of Manufacturers Association of Nigeria (MAN) 2008. The X- axis represents various manufacturing sectors like vehicles, chemicals etc and the Y-axis presents % of foreign ownership

Onayemi (2003) put forward that the economy of Nigeria is too dependent on oil and it is not progressing significantly due to inconsistency in macro economic policies for the growth of different sectors in the economy. When the government only works to safeguard the oil companies' interests, the price of oil does not remain at an affordable level and manufacturers have to pay more for the energy resources they consume in the manufacturing process.

When there is news about the discovery of more crude oil wells in the country, foreign investors start paying attention towards it, resulting in the rise of foreign direct investment (FDI) as well as the employment rate. In this way, the economy of Nigeria is determined by oil production and oil prices. It is therefore evident that Nigeria remains highly dependent on oil, which accounts for 80% of its foreign exchange during the last four decades. This policy has proved to be quite harmful to the country because oil price fluctuation has a negative impact on the economy, causing a certain level of instability and uncertainty. The government neglected the non-oil sectors including manufacturing industry which has made Nigeria the least industrialized country in the region (Onayemi, 2003).

Eedes (2005) studied the economic conditions of Nigeria and observed that since Nigeria is one of the least industrialized countries of the sub-Saharan African region, this resulted in some major weaknesses in the economic structure of the country. These varying levels of negligence contributed to the collapse of the country's basic infrastructure as well as its social services in 1980s. The fluctuation in oil prices further contributed to the economic instability of the country and poverty was widespread, especially in the rural areas (Rankin et al., 2000).

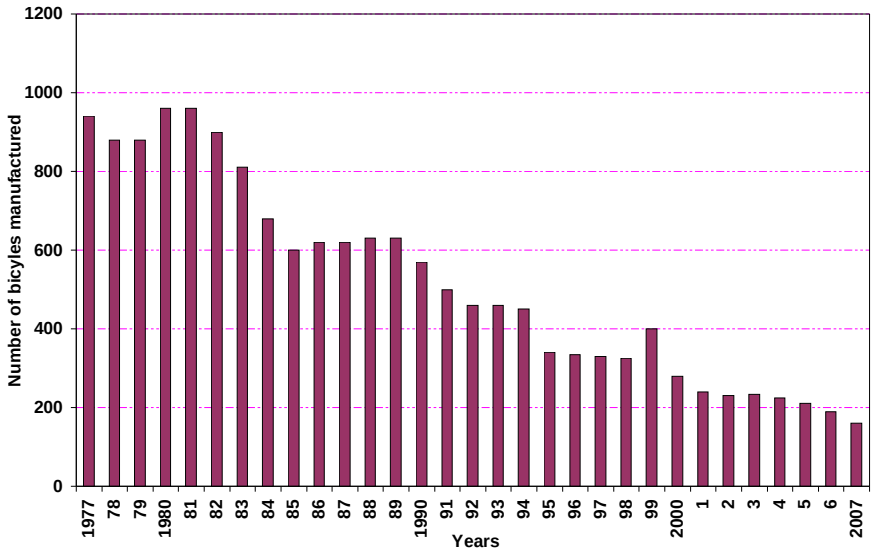
Though the Nigerian manufacturing sector cannot support economic development in its present condition, it has great potential since Nigeria is one of the most attention-grabbing markets of the region by having about 140 million consumers and millions more consumers in the neighbouring countries (Alli, 2008). The importance of the manufacturing sector is also realized from the fact that private consumption expenditures are significantly increasing in the country up to the rate of 15 to 20% per year. However, many problems are hindering the growth of the manufacturing sector in Nigeria and as a result the country is progressing very slowly towards economic diversification.

Dipak and Ata (2003) summed up the economic scenario in Nigeria and the role of the manufacturing sector by identifying the main hurdles that mostly and historically affect its development and growth. These barriers include insecurity, political instability, market-distorting, state-owned monopolies, weak infrastructure and unavailability of finance while Adenikinju (2003) added excessive bureaucracy and rampant corruption.

3.2.2: Historical Performance of the Nigerian Manufacturing Sector

Adenikinju and Chete (2002) conducted an empirical analysis of the performance of the Nigerian manufacturing sector over a 30-year period and observed that the sector was performing with satisfactory growth levels from 1970 to 1980. However, after that phase there was a sharp decline in the growth and profitability of the Nigerian manufacturing sector. Especially after 1983, the negative effects of the oil price collapse in the international oil market can be clearly seen on the sector's performance. Due to that global oil crisis, the revenues of the Nigerian government sharply declined which resulted in reduction in foreign exchange earnings. This in turn forced the government to take several initiatives with the intention of strictly controlling its trade.

There were several import duties enacted in the form of import licences and tariffs, and some quantitative restrictions were also imposed on the importation of certain items. As a result, the manufacturing sector was badly affected because manufacturers faced multiple problems when obtaining raw materials and spare parts for their products and processes. As a result of massive cutbacks in raw materials and spare parts, many of the country's industries were shut down and the capacity utilization in the manufacturing sector declined. For example, between 1977 and 2007, the Nigerian bicycle manufacturing sub-sector recorded a systematic decline in capacity utilization by about a total of 485%; that is, from 948,000 units of bicycles in 1977 to 161,500 units of bicycles in 2007 (BIMAN, 2008). Details are shown in Graph 5. This disturbing trend was also observed by Adenikinju and Chete (2002) in most of the other manufacturing sub-sectors in the country



Graph 5 - Capacity utilization in Nigerian manufacturing sector (1977-2007), Number of bicycles produced per annum in thousands

Source: Constructed from BI-MAN of Manufacturers Association of Nigeria (MAN) 2008.

With the emergence of advanced technology, the production of bicycles has gone down in Nigeria between 1977 and 2007. This is attributed to the alternative forms of transport and carriage, which include but not limited to the use of motorcycles, vehicles, and trains. This is reflected in Graph 5, which shows that less than 200,000 bicycles are manufactured in Nigeria each year (BIMAN, 2008).

Dipak and Ata (2003) stated that the effects of the trade restrictions resulting from the oil price crisis were clearly observed in the form of a 25% decline in the real output of the manufacturing sector from 1982 to 1986. Although the annual growth rate of the Nigerian manufacturing sector was 15% between 1977 and 1981, the government trade restriction measures resulted in the succeeding sharp decline in the growth rate of the sector Dipak and Ata (2003). The share of the manufacturing sector in the total GDP of the country also clearly declined during this era.

In 1977 there was a 4% increase recorded in the manufacturing sector share in GDP and this reached the level of 13% in 1981, but after that it declined to less than 10% in just a few years. Dipak and Ata (2003) and Adenikinju and Chete (2002) concluded that the unavailability and inadequacy of the companies' access to raw material and spare parts needed were among the major factors that contributed towards the decline in the growth rate of the manufacturing sector especially after 1981. Hence, the oil price shock is identified

as the reason behind the policies that ultimately resulted in the decline of manufacturing sector's growth.

Adejugbe (1994) examined the impact of the Nigerian trade policy on the manufacturing performance of Nigeria after the previously discussed observed decline. The researcher studied manufacturing sector performance after 1985 and observed that some significant steps were taken by the Nigerian government in an attempt to make the Nigerian trade regime liberal, and also to promote manufacturing and import-export activities. The adaptation of a flexible exchange rate mechanism, along with the some trade liberalization policies, brought some major changes to the scenario as these steps helped reduce tariffs and trade rates.

At the same time, duties on the importation of foreign goods were also raised, especially of those competing with domestic products. In the same way there were also some steps taken to reduce import duties on many of the raw materials and spare parts that were used in the manufacturing sector, the factor pinpointed for the previous years' decline. These steps were taken by the Nigerian government with the objective of providing the local manufacturing organizations with a sense of protection so that they could be motivated to become more productive and efficient as per a study by Adejugbe (1994).

Anyanwu (2000) with findings similar to that of Adenikinju and Chete (2002), pointed out that the collapse of the world oil market in the early 1980s and the prolonged economic recession resulting from this collapse contributed to the sharp fall in the foreign exchange earnings of Nigeria. This further led to a fall in the performance level of the manufacturing sector of the country. The introduction of the Structural Adjustment Programme (SAP) in 1985 was expected to bring an improvement to the situation, but unfortunately no notable improvement was observed. As a result of the continuing low performance of the manufacturing sector, along with other important reasons, today Nigeria is among the more poverty-driven nations of the world (Mazumdar and Mazaheri, 2003).

Ukaegbu (1998) observes that conducting a complete analysis of the Nigerian manufacturing sector is a complex issue because there is a lack of adequate data about the productivity levels of the Nigerian economy. In particular, there are little authentic data related to the productivity of the Nigerian manufacturing sector. However, some of the research studies conducted at different levels gives some viable information about the performance of the

manufacturing sector of the country through the years (Ukaegbu, 1998). For example, an ad-hoc study conducted in 1989 by Chete and Adenikinju (1994) indicated that the overall productivity level of the Nigerian manufacturing sector over the years has seen very little increase and most of these companies have even faced a decline in productivity as well as profitability.

Findings were further confirmed by a report by the Manufacturers' Association of Nigeria (MAN) which revealed that there was a generally negative trend in the growth of the Nigerian manufacturing sector during the period of 1980-1989. The report also stated that the expectations were low of observing any considerable improvement in the situation. Research studies conducted after that period confirmed this expectation, as they provided evidence that the trend of negative productivity continued and that neither was there an improvement in the profitability level of the sector well into the 1990s & 2000s (Akinlo, 1996). In 2000, Adenikinju and Alaba (2000) conducted an empirical study which evaluated the Nigerian manufacturing sector's performance with regards to the relationship between productivity, performance and energy consumption within the manufacturing organizations.

Utilizing an aggregate model, the researchers measured the changes in the total factor productivity of the sector relative to the change in energy consumption. The research concluded that efficiency and productivity of the Nigerian manufacturing organizations are indeed related to the energy supply and energy price. While the energy resources were found to play a critical role in the manufacturing sector though, it was also discovered that the energy source alone cannot effectively improve the performance of the manufacturing sector in Nigeria.

An important point identified in the research was that the manufacturing sector is too wedded to using old technology and as such, there is a great need for the adoption of more advanced energy-efficient technological devices and techniques. For this reason, reforms concerning the prices of energy options alone do not significantly affect the performance of the sector because it is hindered by the need for improved technology and energy supplies. Thus, the reforms in the energy sector need to happen alongside technological reforms, otherwise the manufacturing organizations cannot entirely enjoy the advantages of the energy resources (Adenikinju and Alaba, 2000).

Ayanwale (2007) studied the effects of foreign direct investment on the performance of the Nigerian economy and manufacturing sector, and revealed that the country is striving to

attract more foreign investors. However, available statistics of the Nigeria's manufacturing and macro-economics data does not paint a good picture of manufacturing contributions to GDP and national employment. For example manufacturing contributions to GDP has been below 10% between 1990 and 2005, and the country's expectation that it will reach 15% by 2010 seems almost impossible. Other manufacturing macro-economics variables and their trends are also shown in Table 2.

	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2010**
Manufacturing Contribution to GDP (%)	6.9	6.7	6.5	6.5	6.4	6.2	5.5	15
Share of workforce in Manufacturing (%)	7.5	7.4	7.4	7.3	7.2	6.8	6.8	20
Industrial Prod. Index % Change	-3.83	3.46	0.36	2.91	2.83	-0.17	4.43	5.00
GDP Growth %	0.30	1.50	5.40	3.00	3.50	10.20	5.50	5.60
Fixed Capital Formation % Change	-7.14	1.20	5.74	2.76	0.82	3.47	3.66	3.88
Govt Consumption % Change	24.57	1.48	5.63	2.68	0.77	3.46	3.63	3.77
GDP Per Capita US$	1089.6	290.3	379.8	394.7	370.2	356.9	413.6	479.8
Inflation (CPI) %	10.32	4.76	14.52	12.96	12.88	14.03	15.72	12.82
Policy Interest Rate %	13.50	12.80	13.00	13.50	13.50	13.00	13.06	13.00
Long Term Interest Rate %	18.18	20.29	21.27	23.44	24.77	20.71	19.18	16.15
Budget Balance % GDP	-4.63	-4.51	-3.24	-3.07	-3.03	-2.96	-2.57	-2.35
Population in millions	120.8	123.9	126.9	129.8	132.8	135.6	138.7	161.8
Population Growth %	2.67	2.55	2.43	2.34	2.24	2.14	2.27	2.34
Current Account Balance US $ bn	-4.24	0.51	8.31	3.83	2.62	5.07	2.54	6.37
Current Account Balance % GDP	-3.22	1.41	17.24	7.48	5.33	10.48	4.42	9.35

Table 2: Manufacturing and Macro-Economic Data and Forecasts for Nigeria
Source: UNCTAD World Investment Report, 2006

Another vital point brought in that foreign investments in manufacturing could be beneficial to the economy. It is necessary that human resource issues are resolved as well so that the financial resources can be effectively utilized. In a survey report for the United Nations Industrial Development Organization (UNIDO), Malik et al. (2004) disclosed that for many years the Nigerian manufacturing sector has been working with mostly unskilled and

unqualified labour. Actually, to date, the qualifications and skill level of the sector's workforce is still very low. This is an important issue as it directly affects the quality of the manufactured products in Nigeria. As it turns out, the reason behind the employment of unskilled labour is the inability of the manufacturers to pay actual skilled labour well.

Mazumdar and Mazaheri (2003) argued that average wages was very low in most of the manufacturing firms in Africa as the owners settle for unskilled labour. This is because highly skilled labourers come with high salaries that the firms cannot afford, thus, they keep on employing unskilled labour on low wages. So, though there were employment opportunities in the manufacturing sector, they did not alleviate poverty levels; all while the quality and standard of the labour were stagnant. The researchers suggested that the manufacturing companies must realize the importance of investing in skilled labour so that the manufacturing process can be run on updated methods. Also, the overall poverty level could be raised by the stimulation of paying good wages to skilled labourers (Mazumdar and Mazaheri, 2003).

Alli (2008) reviewed the situation and stated that after going through several ups and downs, the final shape of the Nigerian manufacturing sector is mainly made up of a few players. These players are the multinational, national, regional and local manufacturers, investors, and companies. The multinational companies are still operating and surviving in the country because of strong financial and resource support, the other operators have either disappeared from the scene or are struggling to survive in the manufacturing industry. This is because of the unpredictable policies and strategies implemented by the government, effects of globalization, and the lack of raw materials obtained locally for the manufacturing process. As a result, the aforementioned players of the sector started diminishing from the scene, and the productivity and efficiency of the manufacturing sector were negatively affected. At present, the capacity utilization in the sector remains lower than 35% (Ayanwale, 2007).

The Nigerian Bureau of Public Enterprises itself identified some of these main barriers that affected, and continue to affect, the growth and development of the Nigerian manufacturing sector. Their reasons include high interest rates, unpredictable government policies, non–implementation of existing policies, ineffective regulatory agencies, and infrastructural inadequacies, dumping of cheap products, unfair tariff regime, and low patronage (Dipak

and Ata, 2003). On top of these, as mentioned, a skilled workforce and foreign investments are also in short supply.

In summary, the retrospective analysis of the manufacturing sector of Nigeria could serve as a lesson for other countries. It shows how the mismanagement of resources and the negligence of an important sector can contribute to the low performance of the whole economy. In Nigeria, the government used to place sole emphasis on the oil sector and as a result the manufacturing sector failed to prosper. Now, even after the spike in oil prices, the country can only look towards a very insignificant contribution from the manufacturing sector caused by the inadequate policies and planning of the past (Ayanwale, 2007).

3.2.3: The Present Situation of the Nigerian Manufacturing Sector

Alli (2008) reviewed the more current performance of the Nigerian manufacturing sector by surveying the results of a study conducted in 2007 by the Manufacturers Association of Nigeria (MAN). The report disclosed that during the last few years many of the manufacturing companies in the country have, as the past studies predicted, faced bad times. It was discovered that only a meagre percentage of manufacturing companies (10%) are operating at a sustainable level, whereas as much as 60% are going to shut down or have already shut down after facing several series of financial and other kinds of crises.

Many factors were identified by MAN to be the root cause of the problem. The reasons behind the low growth and performance of the Nigerian manufacturing sector during the last few years include “high production costs caused by energy, high interest and exchange rates, influx of inferior and substandard products from other nations, multiplicity of taxes and levies, poor sales partly as a result of low purchasing power of the consumers, bogged down with delay in clearing consignments due to existence of multiple inspection agencies at the ports, etc” (MAN, 2008).

However, according to Mazumdar and Mazaheri (2003) despite this uncertainty in the business environment some Nigerian companies were successfully operating in the country and getting high returns on their investments through superior competitive performance (Mazumdar and Mazaheri, 2003). The researchers analysed the strategies and management planning of two Nigerian firms that have achieved a high level of performance in the business sector. They then highlighted the main factors that contributed towards the success

of these organisations. Some of these factors were the introduction of transparent management policies and competitive strategies, among others.

Dipak and Ata (2003) argued that the main problems facing the Nigerian manufacturing sector are the ongoing advancements in technology, as these were taking the international manufacturing market towards higher levels of competition. When there is less protection for companies, these unprotected companies have to focus more and more towards the quality of their products and do so by increasing their expenditure on research and development. In Nigeria however, the research and development work is not being done at a good enough level required for the constituents to even see a steady growth in the performance of manufacturing organizations. It becomes necessary then, for the Nigerian government and the private sector partners to intervene in order for the situation to improve.

Malik et al. (2004) disclosed, in a survey report administered under UNIDO's Centre for Study of the African Economy, that the skills and technology usage levels in the Nigerian manufacturing sector are not very satisfying. Not only that, the report also revealed that the Nigerian manufacturing sector is not even open towards the usage and adoption of the new technologies and skills; thus stagnating and even negatively affecting the efficiency of the firms. The reason behind giving less importance to new technologies and skills is traced back to the deficiency of adequate investment in the sector.

Only half of the companies that participated in the survey disclosed that they made investments in technology during the period under study, this alone shows the trend in technology investment in the sector. The survey also divulged that the lack of financial facilities is exacerbated by the unwillingness of the investors to give their money to the manufacturing companies. When firms invest less in technology, they also invest less in the skilled labour needed for these; and with no other sources for capital for investment they are not in a position to remedy the situation. With barely any advanced machinery and techniques of production, the firms are rendered unable to compete in a larger scale. As all of these issues continue to result in the low level of competitiveness of the Nigerian manufactured products, the overall efficiency and productivity of the sector will remain on a lower scale (Malik et al., 2004).

Ojowu (2003), with his analysis of the situation of the Nigerian manufacturing sector, came to the point that capacity utilization is an important issue that must be properly addressed in

all discussions and all measures to be taken in the future. The researcher argued that the sector is progressing very slowly due to low capacity utilization. Issues associated with capacity utilization such as capacity decline, capacity expansion and capacity mortality are essential discussion points in the issue of bringing quality into the performance of the Nigerian manufacturing sector. On top of these issues, the burden of external debt is also affecting the sector's performance.

The researcher also argued that the government is not giving enough attention towards the policies related to the manufacturing sector as compared to those of other sectors. To contend with Ojowu's (2003) last point though, reforms must also be applied to different sectors that are associated with the manufacturing sector and not just the manufacturing sector itself; as the high or low performance of one sector can affect the progress of the others. For example, if the government works to improve infrastructure then the manufacturing of products will also be improved.

Enebong (2003) predicted that the level of the Nigerian manufacturing organizations' performance would continue to see a decline because as it is now, the manufacturers will have even more problems in accessing raw materials due to stiff competition from foreign firms. He theorizes that many of the policies implemented by the government in the late 1990s are still acting as barriers to manufacturing sector growth. Some of these policies include backward integration and the inward orientation strategies towards import substitution. The private sector also failed to play a significant role in the manufacturing industry; and there are certain reasons behind this such as import barriers, tariffs, licenses and other policies that resulted in raw materials unavailability.

Alli (2008) however, pointed out that the government plays a very important role in the entire scenario of bringing improvements into the Nigerian manufacturing sector. The researcher observed some positive signs from the present Nigerian government and identified some of the major strategies that are being adopted with the intention of improving manufacturing sector performance. According to Alli, the government has realized that the manufacturing sector can act as the backbone of the economy and as it progresses in a positive direction, the country will consequently grow and prosper also. In this regard, the government has decided to make sure that the manufacturing sector will receive access to the domestic, regional and international markets. This is of course after adding value to

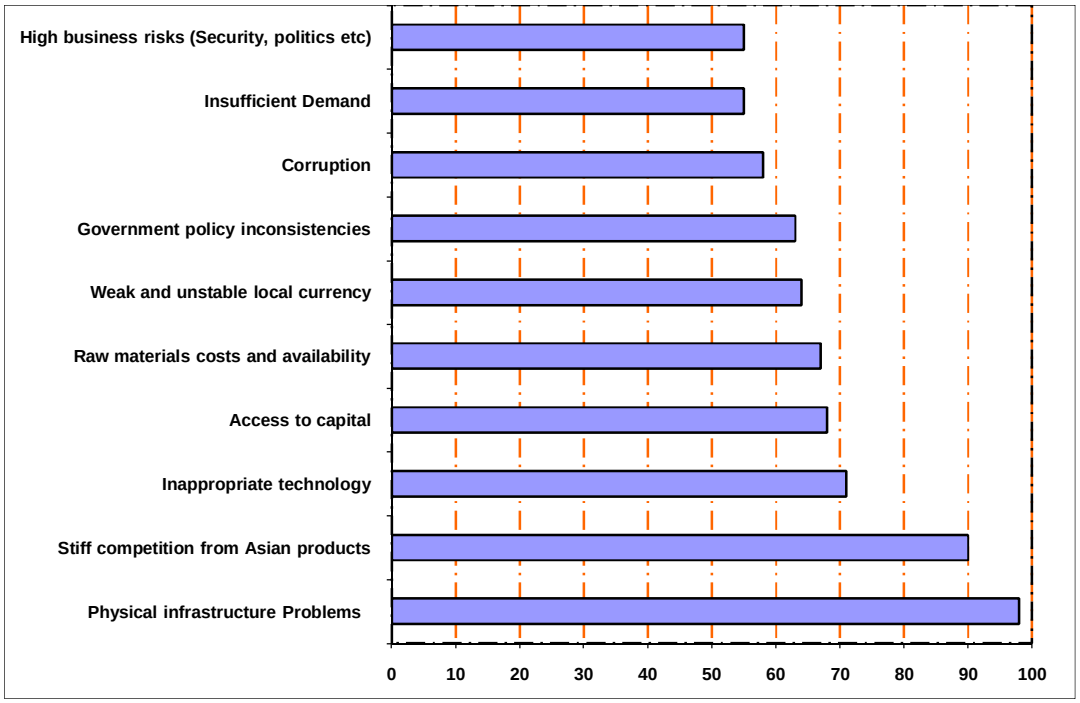
the companies' products; and for this, the sector will need to take advantage of the country's oil and gas sector.

The Nigerian government also seeks to apply the Public Private Partnership (PPP), wherein the government will invest in the development of infrastructure and will become a facilitator to the manufacturing sector. In effect, the manufacturing industry will gain great advantages from the improved infrastructure and the private sector will also be encouraged to invest in different productive manufacturing industries. Moreover, the government is also considering the cluster concept suitable for the economic condition of the country, keeping in view the geographical proximity and other ground realities (Alli, 2008).

3.2.4: Main Problems and limitations of the Nigerian Manufacturing.

The performance of the Nigerian manufacturing sector over the last four decades shows that there are some important problems that acted, and are still acting, as barriers to the growth of this sector. Researchers have also argued that some basic limitations are impeding the growth and development of the sector, even despite past studies and proposed solutions. In order to identify these core challenges, many of the researchers have conducted studies of the past and present conditions of the manufacturing industry of Nigeria. These researchers conducted different quantitative and qualitative studies during different periods and identified certain important limiting issues to aforementioned solutions (Bigsten and Soderbom, 2006).

Bigsten and Soderbom (2006) conducted a study which investigated the main challenges confronting the manufacturing firms using ten selected variables as shown in Graph 6. From the graph, it is clear that the first perceived variable retarding manufacturing firms is physical infrastructure problems (98%) followed by stiff competition from Asian products (90%) and then inappropriate technology (71%) and so on as shown in the Graph 6.



Graph 6 - Perceived Main Problems Facing the Nigerian Manufacturing Sector as at 2006. The X- axis shows extent of perception in percentage while the Y-axis shows the factors used

Source: Bigsten and Soderbom (2006)

The Nigerian government does not but strongly resist the Asian products to enter the country, hence posing a great threat to the manufacturing sector. The least problem faced by the manufacturing sector in Nigeria is the high business risks, such as security and political issues that accounts for approximately 55%.

Another approach to identifying the causes of manufacturing failure in Africa is to classify them according to external and internal sources, as illustrated in Table 3.

External	Internal
- Adverse economic conditions - Capital shortage - High interest rates and bank charges - Consumers preference to foreign goods - High minimum wage - Unstable/unfavourable government Regulations and policies - Inadequate/poor infrastructure - Political instability - Stiff Competition from Multinationals - Inadequate patent protection - In adequate technological learning centres	- Management experience - product innovation - Personnel - old and inefficient manufacturing Technology - Succession - Scale (size) of operation - defeat tendencies - The owner takes too much money out of the business to support a personal life style - Over ambitious growth, some times by ill judged acquisitions and some times

Table 3: Causes of Manufacturing Firms Failure by Source in Africa
Source: Enebong, 2003

Indeed, when reviewing the above values, there is no general consensus in terms of the variables for forecasting either failure or success; although capital, appropriate technology and experience are featured more frequently.

Ayeni (2003) identified the core problems surrounding the Nigerian manufacturing establishments after he analysed their pattern of growth. The researcher pointed out that the establishments are lagging behind in attaining sustainable growth because most of the time, their operators and the Nigerian authorities reacted to market situation by formulating short-term policies and strategies. The researcher pointed out an important flaw in the economic policies of the country by arguing that there is less attention given to satisfying the

needs of the domestic consumers, thus the demands for locally manufacturing products and goods remain low.

In addition to Ayeni's (2003) findings, the acute shortage of infrastructure can also be identified as a factor that frequently hinders the manufacturing growth because organisations and agencies related to the provision of different infrastructures often failed to adequately deliver. This affects the flow of work in the manufacturing sector. At the same time the manufacturers and the investors also need motivation and encouragement so that the investors can become open towards investing in the different manufacturing firms. Ultimately this would lead to the manufacturing companies obtaining access to the finances needed not only to keep their manufacturing operations afloat, but to run more effectively.

Alos (2000) analysed the business environment of Nigeria and observed that the performance of the manufacturing sector has been very uncertain, even nearly chaotic, for many years. The researcher also pointed out another important barrier that exists in the Nigerian manufacturing sector, and that is the low rate of capital utilization; not unlike the conclusion put forth by Ojowu (2003). He observed that in the manufacturing sector there is gross underutilization of resources and only 30% to 40% of the capital is being utilized in this sector due to "frequent power outages, lack of funds to procure inputs, fall in demand for manufactured goods and frequent strikes and lockouts by workers and their employers" (Alos, 2000).

Okejiri (2003) revealed that one of the largest constraints for the high productivity of the Nigeria's manufacturing sector is, again, the low level of technology; as advancements in technology are changing the manufacturing sectors of countries all over the world. Developing countries are rapidly adopting new technologies so that they can secure higher productivity and revolutionize their manufacturing industry. Unfortunately, the Nigerian manufacturing companies are still not focusing enough on acquiring modern machinery and as mentioned, up to now they are still using the same methods and machinery that were introduced as far back as the 1960s and 1970s (Adekoya, 1987). It is this stagnant, almost stubborn, mindset that greatly limits this solution for the future growth of the sector.

Meagher (2006) meanwhile viewed the problem of Nigerian manufacturing sector from the perspective of inadequate academic research and development support from the Nigerian universities and other like institutions. He recommended that the Nigerian research institutions should be adequately funded by the Nigerian government and public, private,

and even multinational organizations. This is so that these institutions will engage in purposeful researches that will help revive the decaying manufacturing sector. These institutions may also essential in preparing for the challenges of new oil discoveries; especially in the deep platform areas and in the northern part of the country where initial studies conducted by foreign oil companies have shown the possibility of the presence of oil. On the part of the manufacturing firms, the researcher also concluded that they must set up or upgrade their research and development departments so that new technologies and new raw local raw materials are discovered, tested and used.

A study conducted by Havrylyshyn (1990) pointed out some of the other major problems that act as barriers to high quality growth and performance in the Nigerian manufacturing sector. The researcher concluded that while the government of Nigeria has shown its willingness to promote and support the growth of the manufacturing sector, despite the measures they have taken there is a long way to go for the manufacturers to progress in an efficient manner. According to the researcher's findings, investors in the manufacturing sector often lack a business-friendly environment. This environment is due to the legacy of the past misguided trade-related government policies that caused negative impact on investment-related operations; damage that cannot be easily repaired.

In the same way, Adenikinju (2003) blamed the government for the current inefficient performance of the Nigerian manufacturing sector. The researcher claimed that the increased interference of the government in different issues related to the manufacturing industry minimized the role of the private sector due and as such, the contribution of the private manufacturers seems to be very low in terms of manufacturing output.

Nishimizu and Robinson (1994) observed that the Nigerian manufacturing sector has been in great need of reform for many years as the sector has been unable to support the economy of the country due to its many problems. For example, the manufacturing sector strongly feels the need for private sector friendly policies so that the entire manufacturing process can be boosted to a private sector level, and so that there could be better capacity utilization in the sector. The researchers also pointed out that there is a great need for many reforms in the sectors related to manufacturing, such as the power sector.

As mentioned, when the power sector starts to progress effectively then the manufacturing sector will also perform well with the support of a reliable power supply. In the same way the infrastructure also requires improvement including the railways, roads and other

communication systems. Although the government has put forth reforms regarding these issues and those put forth above by Havrylyshyn (1990) and Adenikinju (2003) their full implementation and progress will be underway for the manufacturing sector and even then time is needed for adjustment and stabilization.

Talabi (2003) argued that the problems associated with the decimal performance of the Nigerian manufacturing originations are the by-products of policies and strategies that have been in practice for many years. To resolve these challenges, the government must focus upon the formulation of an equipment-leasing law that will work to improve the weak infrastructure of the country. If this is implemented, in turn the manufacturers will be encouraged to manufacture high quality products. It is also vital that there must be good management of funds and donations in a proper manner to assist manufacturing activities.

Many of the funds and finance facilities provided by international and regional financial and trading institutions like the World Bank and the African Development Bank (ADB) are highly mismanaged at a national level; as a result, the fruits of the funds do not reach the manufacturing sector (Dipak and Ata, 2003). If the government succeeds in providing the funds to the manufacturers, and if the manufacturers will make positive use of the funds, then the manufacturing industry of Nigeria can progress and make its presence valuable at the regional and international level.

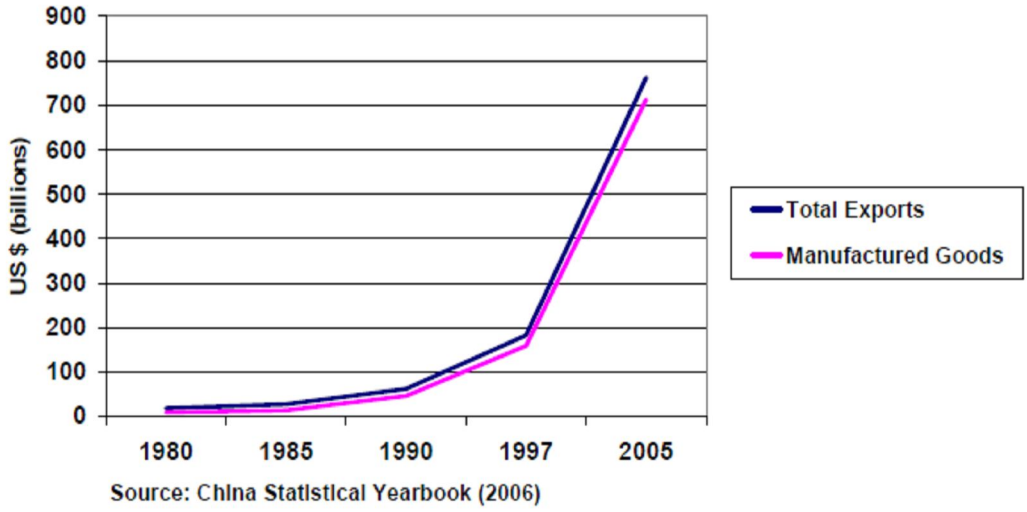
3.3 MANUFACTURING SECTORS OF SOME DEVELOPING COUNTRIES

This section presents a comparative review of the performance of Nigerian manufacturing sector with those of China, Malaysia and India. The aim is to bring forward the strategies followed by these countries in developing their manufacturing sectors, so that the Nigerian manufacturing sector stands to draw some lessons.

3.3.1: Chinese Manufacturing Sector Performance

Jim (2007) noticed that in the changed manufacturing scenario of today it becomes very important that countries go for the manufacturing of cheaper goods faster; consumer goods in particular are highly required to be manufactured with shorter life cycles and low prices. China is progressing well in the manufacturing sector because the country competes with the world in the manufacturing of cheap goods quickly. Chinese manufacturing has grabbed a major share in global manufacturing; for example, China has a 50% share in the manufacturing of cameras, 30% in air conditioners and televisions, 25% in washing

machines, and 20% of refrigerators. These figures show the major contribution of the Chinese manufacturing sector at an international level.



Graph 7 - Manufacturing exports and total exports between years 1980 and 2005.

Based on the sources from China Statistical Yearbook of 2006, the country's total exports and manufacturing goods has been increasing as can be seen in Graph 7 between 1980 and 2005. For instance, total exports and manufacturing goods increased from US $150 to US $ 750 between 1997 and 2005.

There are some positive attributes of the Chinese manufacturing industry that is contributing towards the efficient growth of the sector. The Chinese manufacturing sector is currently producing goods at a very low cost of production. At the same time there is also an increase in the continual manufacturing prowess of the Chinese manufacturing sector. China has identified the key point that in order to retain its consumers, it is necessary to cut down the prices of the manufactured goods. Thus the country is focusing on the manufacturing of products with very low cost so that it can offer products with good quality at low prices (Jim, 2007).

Due to this reason Chinese exports are increasing at a high rate all over the world and at the same time the share of Chinese manufacturing at an international level is also increasing. The Chinese manufacturing sector has dramatically worked to cut down the prices of manufacturing products and according to rough estimates the country now offers manufacturing products at almost half the prices as compared with other countries. That is

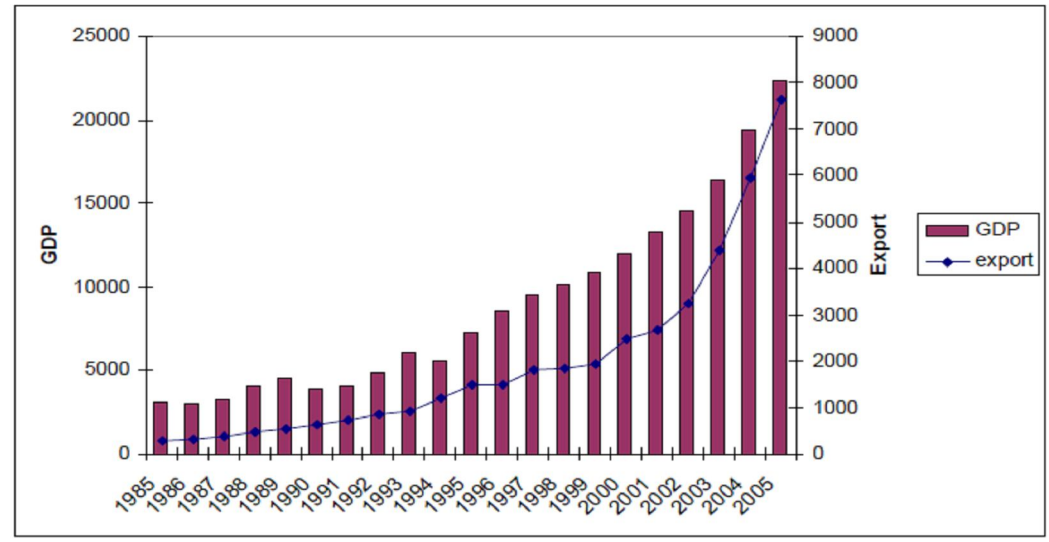
why the other countries prefer to import different manufactured products from China as they can have good quality at low prices (Jim, 2007).

One of the main reasons behind the success of the Chinese manufacturing products is that most of the Chinese firms tend to give priority to the innovative features in their manufacturing and they try to manufacture goods with new and advanced features. As a result of all these developments, China has become an important and successful player in the manufacturing scenario at international level and the economic development of the country is also accelerated. Ali (2007) pointed out that the manufacturing industry has changed a lot in the recent years due to the emergence of the new technologies and the increasing demands of consumers. In this highly competitive marketplace there are several important issues ahead of the manufacturing companies and they have to face a series of challenges to assure their survival in the manufacturing industry of the modern era.

Among the core challenges, the issue of intellectual property has also appeared as an important problem for the manufacturers because due to technological advancements everyone can get access to different products and techniques of manufacturing. Like all other countries China is also facing serious intellectual property issues and the country is looking towards long term solutions to cope with this problem (Ali, 2007).

Chinese manufacturing companies are attempting to design such products with innovative designs and they are in great need of some rules and regulations that can do something to protect their work. In this regard the country has formulated and implemented some intellectual property rights and acts but in practice these acts are not forceful enough to prevent the companies and their products from being copied. Thus it is very important for the government of China to develop sound strategies for the prevention of intellectual property thefts otherwise there will be rise in the wave of discomfort in the industry and the overall performance of the manufacturing sector will also be badly affected. The researcher also revealed that another important challenge in front of the Chinese manufacturing companies is to arrange highly skilled labour (Jim, 2007).

Graph 8 reveals that China has been experiencing an increase in GDP and exports between 1985 and 2005. This implies that the country's manufacturing sector has been performing better as reflected in the National Bureau of Statistics, China Statistical Yearbook.



Source: PRC National Bureau of Statistics of China, *China Statistical Yearbook*

Graph 8 - China's GDP and export from years 1985-2005

The manufacturing sector of the country is trying to adopt advanced technology and for successful handling of these technological devices and machinery they also need highly skilled labour. It was a general impression that there is very cheap labour available in China but the fact is that when there is a rise in the demand for highly skilled and qualified labour, the cost of labour also increases and the manufacturing companies of China now have to attract skilled labour by offering competitive salaries and incentives. In this regard it becomes very crucial for the manufacturing companies of China to restructure and reanalyze their recruitment policies so that they can be in a better position to conduct human resource management, and the skilled labour can add to the efficiency of their companies (Jim, 2007).

There is relatively low cost of labour and also there are many manufacturing companies that are facing difficulties in getting highly skilled and qualified workers. Despite all these challenges there are still many opportunities in the Chinese manufacturing sector and the sector is progressing well due to which the manufacturing sector has succeeded in playing an important role in the economic development of the country as well, but in order to assure successful manufacturing operations in China, the government of China should have to focus upon the issues of intellectual property theft and skilled labour availability so that the sector can also continue good performance in the coming decades (Wright, 2001).

Wright (2001) revealed that China has passed through a golden age of manufacturing, however in recent times world oil prices have had an impact on the performance of the Chinese manufacturing sector as well. The researcher revealed that a rise in oil prices has led to an increase in manufacturing cost and Chinese firms have to pay more for the diesel and energy resources that they use in their manufacturing processes. The transportation cost is also raised due to the rise in the oil prices and the companies have to pay more for getting access to raw materials and spare parts required in the manufacturing of certain products. In the same way the Chinese manufacturing sector is also facing the challenge of the availability of skilled and qualified labour at low cost that has become very difficult in recent times, details are as shown in table 4. All of these issues have built up pressure on the Chinese manufacturing industry and if these issues and problems are not resolved early then China will lose its position in the international marketing scene.

The sector has to seriously look towards the issue of talent shortage in the sector. Though many students leave university after taking their degrees every year in different advanced fields, due to low labour costs they prefer to move to other countries where they can get better incentives and salaries; thus the Chinese manufacturing companies must work to stop the talent from going outside the country, otherwise the availability of skilled labour will become a very serious threat to the manufacturing industry of China (Wright, 2001).

Period Year	Output Growth (%)	TFP Growth (%)	Capital Contribution (%)	Labour Contribution (%)	TFP (%)
1952-1978	10.5	1.6	74.3	10.8	14.9
1979-1992	8.6	-2.7	120.9	10.3	-31.1
1993-2005	10.5	3.2	70.9	1.1	28.0
1979-2005	10.0	0.3	92.1	5.1	2.8

Table 4 – Changes in Total Factor Productivity in Chinese Industry (1952-2005)

Source: *Jim, 2007. "Total Factor Productivity Growth in Chinese Industry. 1952-2005"*

Schneider and Brown (1999) found that the Chinese manufacturing sector is now struggling with the problem of how these firms can manage to manufacture quality products at low prices when there is a rise in labour, energy and material costs. It is a fact that labour cost is very low in China compared with other manufacturing sectors and at the same time there is

low cost of capital and the country is doing well in adopting new technology. The Chinese manufacturing sector has proved capable of adopting new technology and advanced techniques of manufacturing due to which the manufacturing quality of Chinese manufactured products are accepted at an international level.

The Chinese manufacturing sector has succeeded in making its position in designing standard products at relatively low cost, due to which countries from all over the world are attracted towards the Chinese manufacturing sector. China is exporting goods and products to different countries at low prices because Chinese manufacturers keep low rates of profit for themselves to keep the price of the manufactured products lower. In this way they successfully retain their existing consumers and attract new consumers from all over the world (Wright, 2001).

David (2007) observed that the most important reason behind the success of the Chinese manufacturing sector at international level is that the Chinese manufacturers take the standard and quality of the product as a very serious issue. They always remain concerned about the maintenance of their standard and quality in their manufacturing process. Due to the success of the Chinese manufacturing industry there are many international firms operating in the Chinese manufacturing sector. According to a study, about 59 percent of US manufacturing firms have operations in China, mainly because they have low spending on the production of quality products in the Chinese manufacturing industry.

International firms are also attracted towards China because they realize that the manufacturing industry is capable enough of coping with ongoing rapid advancements in technology and they are good at adopting and utilizing the latest techniques of manufacturing. The role of the government is very important in the entire situation because the regulations and rules related to allowing the operations of the foreign firms are important issues that are decided by the government. When the government opened the country to international investors and manufacturers as an attempt to liberalize trade, there was a massive increase in companies coming to China and there was a reasonable amount of FDI that came into the country through the manufacturing sector. Along with the regulation related to trade liberalization, the government of China also has to play an important role to discourage intellectual property theft because it is also an important issue ahead of Chinese manufacturers as well as for those international companies that operate in China (David, 2007).

Mike (2008) observed that the rapid growth and development of the Chinese manufacturing sector is well supported by technology usage and innovative designing. This is forcing the experts to make the prediction that in the coming years the input rate of the Chinese manufacturing sector will be much higher than that of the United States. At present there are huge amounts of products that are manufactured in China for use in the USA and these products are both manufactured by Chinese companies and then exported to the US or the American firms manufacture these products in China to take advantage of the low cost of production within the Chinese manufacturing industry.

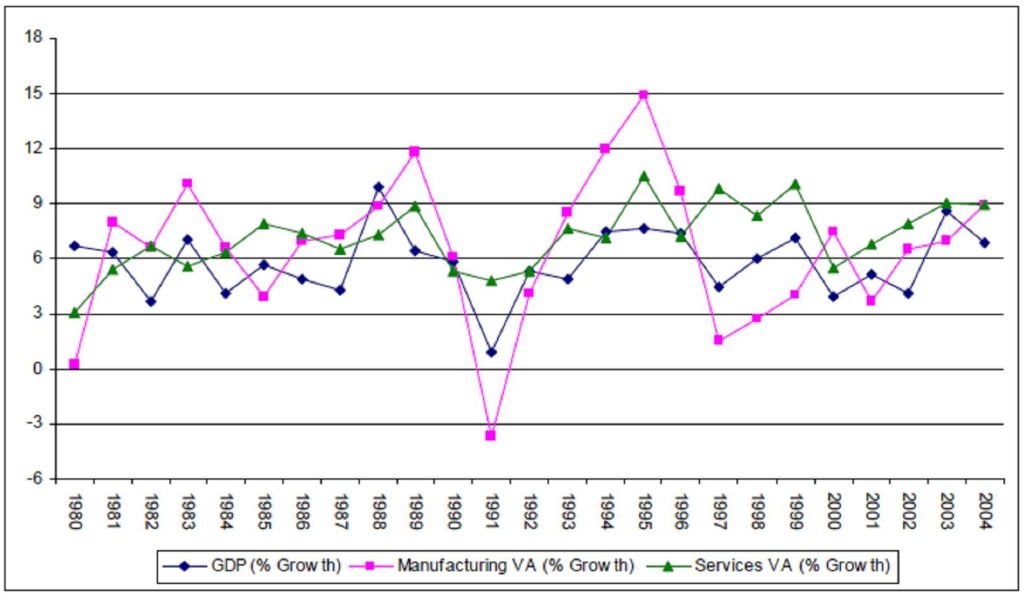
Due to the technology adoptability capability, the Chinese manufacturing sector has emerged as a great opportunity for US manufacturers. As a result the economy of China is witnessing an improvement in various other economic fields as well, because when foreign companies came into the country, they used to invest in other sectors. So there is a rise in foreign investments in different sectors of China, including finance, information technology, and business services. In this way the growth and development of the manufacturing sector brings FDI into the country and other sectors of the economy also benefited (David, 2007).

The entire economy of China is flourishing and the main reason behind this situation is the decision of the Chinese government to open the doors of China to every country by allowing them to start their operation in the country through the implementation of certain trade liberalization measures. Thus the researcher credited the government with taking up the manufacturing sector of the country up to the level where foreign companies are highly interested in operating in the sector and in turn the entire economy is enjoying the benefits (Mike, 2008).

3.3.2: India's Manufacturing Sector Performance

Kaliappa (2004) revealed that the manufacturing sector has an important role to play in the economic scenario of India and it is revealed that the sector has significantly contributed towards the economic sustainability of the country especially during the 1970s and 1980s. While analyzing the performance of the Indian manufacturing sector from the 1970s to the 1990s, the researcher revealed that the manufacturing sector in India has seen many ups and downs and the policies implemented by the government with the intention of bringing an improvement in the economic scene have sometimes been proved to be beneficial for the sector and sometimes there are no positive results from these reforms observed on the functioning of the manufacturing sector. For example in the early 1990s the government

implemented several economic reforms but the manufacturing sector performance went down by the end of the decade after showing a good level of progress in the early 1990s as shown in Graph 9.



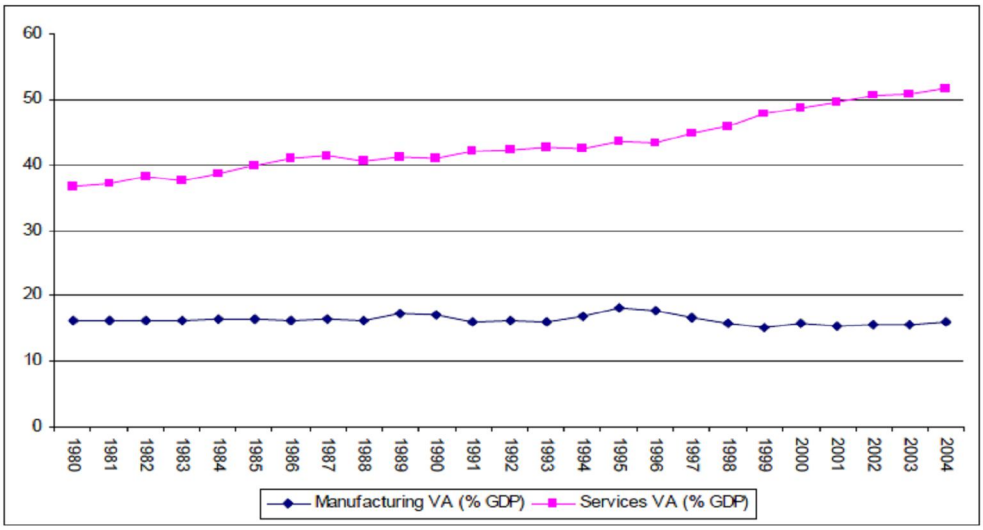
Graph 9 - Growth rates of GDP, Manufacturing Value Added and Services Value Added. X - axis represents years while Y-axis represents percentage growth.

Source: Mitra et al., 2006

The researcher revealed that an important reason behind the significant performance of the Indian manufacturing sector is the fact that the sector used to be an input-driven factor where a high level of technical efficiency existed. When the manufacturing sector received good investment for the purpose of research and development, the sector kept progressing well and the level of technology usage in the sector also improved. In order to keep the Indian manufacturing sector on the path of sustainable growth it was necessary to have adequate investment in the sector for the purpose of research and development so that the sector can carry on with its function by employing the latest technology and manufacturing techniques.

In this way the investments in research and development are identified as one of the main causes that have contributed towards the efficient performance of the Indian manufacturing sector for many decades Kaliappa (2004).

Shashanka (2008) reviewed the performance and contribution of the Indian manufacturing sector in the economic growth of the country and identified many of the positive signs that confirm the positive and supportive role of the sector in the economic growth of the country. The researcher identified the manufacturing sector as playing a vital role in India as shown in graph 10 and that it is one of the most important sources of generating employment for the workforce. At present there are an estimated 25.5 million people employed in manufacturing firms in the country. The increasing rate of employment in the manufacturing sector shows that the sector is becoming increasingly important for the economic development of the country. The non-farm manufacturing sector is an especially significant source of employment where many millions have been employed.



Graph 10 - Sector Value Added as a Proportion of GDP. Source: Mitra et al., 2006. X -axis represents years while Y-axis represents percentage growth.

The researcher also concluded that the private sector also has a considerable share in manufacturing sector activities and operations and there are about 39.6 million retail and manufacturing firms that are owned and operated under private ownership. The researcher concluded that the high rate of employment in manufacturing shows that the sector has become the backbone for the country and the private ownership contribution in the sector's performance further explained that the efficiency of the private sector can add to the performance of the manufacturing sector. The government must facilitate and encourage private owners to take an active role in manufacturing operations if they want good support

from private firms in the development and growth of the manufacturing sector (Kaliappa, 2004).

Shankar (2007) found that the manufacturing sector's strength and stability will be one of the most important issues ahead for the government for many years and in different five-year economic plans, the government of India has attempted to focus upon promoting the sector by identifying the growth potential and opportunities within the sector. In the five-year plan approved in 2007 for the period 2007-2012, it is estimated that the Indian manufacturing sector will witness growth and development at 10-11 percent annual growth rate (Kaliappa, 2004).

The growth of the manufacturing sector in the country has also shown signs that the coming decade will see manufacturing sector growth in India. The researcher also revealed that the manufacturing sector in India is modest in size from a global perspective and as compared with other developing nations like China and Malaysia, the net output of the sector is low i.e. $115 billion in 2005; whereas the output of the manufacturing sector of China was $750 billion and the US manufacturing sector was more than $1,500 billion in 2005 (Shankar, 2007).

The research also pointed out that the Indian manufacturing sector has gone through many turbulent stages, and share of the manufacturing sector output in the total GDP of the country also remains low in some years (Kaliappa, 2004). For example in 1995-96 manufacturing contributed just 18 percent of the total Indian GDP and this rate dropped further to 15 percent in 2001-02. While looking at the share of the sector in GDP during the entire decade it is found that 16.7 percent of GDP is shared by the manufacturing sector output during the period 1990 to 2000. When compared with the share of the manufacturing sector in the GDP of some developing East Asian countries, the contribution of the sector remains very low in India. This is because of a great need to implement reforms in the sector that can work for increasing the input share of the sector in the GDP of India so that the manufacturing sector can contribute to the sustainability of the economy.

The policies of the government implemented during different periods have had a strong impact on the performance of the manufacturing sector. In the early 1990s there were some policies enacted by the government that reduced the industrial and trade control in the country. As a result of these reforms the manufacturing sector progresses significantly but

this was just for a few years and by the end of the decade the growth rate had sharply declined (Nilachal, 2004).

Thus in the present highly competitive scene it is necessary that the sector must be supported by adequate investment and a high level of corporate performance so that it can develop the potential and capabilities at an international level and can become a strong part of the Indian economy. It is also necessary that the government must formulate policies and plans for increasing the growth rate of the manufacturing sector in the next five-year plan that is estimated at just 10-11 percent and looks an easy target. This is necessary because at an international level the manufacturing sectors are already booming in the perspective of the powerful, import-intensive boom in the US, thus the competition has increased in the sector and India must set high targets for the growth of the manufacturing sector in the coming five-year plan (Kaliappa, 2004).

The exchange rate policy must be managed in an effective manner and along with that the labour incentives and export and import substitutes must be given proper attention. The infrastructure of the country must support the manufacturing process through the provision of adequate power supply, water, roads and urban services. All of these measures should be taken to assure the growth and development of the manufacturing sector in the long run and the role of the government are crucial in the entire situation (Kaliappa, 2004).

Nilachal (2004) pointed out that the contribution of the manufacturing sector to Indian economic growth cannot be neglected and during some of the periods, it has reached up to 25 percent. However it is very important to understand that one organised and one unorganised sector exists and operates within the Indian manufacturing sector because many of the manufacturing units "are not registered under Section 2 of the Factories Act, 1948. The researcher examined the performance of the Indian manufacturing sector in terms of Wage Productivity (WPR), Capital Productivity (CP), Industrial Capability (Output-Input Ratio), Workers' Performance (GVA per Worker) and Wage Rate by state" (Nilachal, 2004, p23) and found that there is great room for improvement in the situation. But even the performance of the sector so far is not too disappointing and some positive reforms in the sector can work for further growth of the sector.

Chidambaram and Ramamurthy (2005) pointed out that the manufacturing sector is a great opportunity in front of India that can make the position of the country very stable and strong in the technology-driven market place of the modern era. The researchers observed that the

Indian manufacturing sector is blessed by the technology and its appropriate usage in the manufacturing process due to which there is a great possibility that the country can become an innovative leader in manufacturing at regional and international levels. However it is necessary that the country must focus on the introduction and adoption of a coherent synergy in science- and technology-related activities.

At the same time the manufacturing sector is also required to implement revolutionary plans and policies for "human resource development, research and development privatization, academia-industry interaction, and international collaboration". Along with these issues, the technical knowledge and skills of the workforce is also identified as an important factor that can improve the performance of the sector. The Indian manufacturing sector is regarded as the manufacturing sector in which there is great room for innovating different ideas and concepts related to the manufacturing of low-cost high quality products and services. There is a positive sign in the Indian manufacturing sector that the sector is progressing significantly towards innovative technology. The automotive sector is also booming in the country and as a result the country stands strongly at an international level and the Indian manufacturing sector has been recognized as having great potential for the manufacturing of innovative featured products (Kaliappa, 2004).

Analysts and researchers have also observed that the government of India is also concerned in bringing an improvement in the manufacturing sector of the country and for this purpose there have been many polices and plans formulated at government level that are intended to improve the manufacturing sector situation. For example, Prithwi (2008) stated that the government has set the estimated growth rate for the manufacturing sector at 10-11 percent but the experts believe that there must be a rise in this growth rate and the Federation of Indian Chambers of Commerce and Industry (FICCI) has also put forward the suggestion before the government that it should ensure a 12 percent growth rate of the sector in the coming years and for this the government must design such policies that can increase the share of the manufacturing sector in GDP.

The experts also identified some of the steps that can work to bring positive changes in the situation. The government has suggested that the companies operating in the manufacturing sector must be provided with guidelines and directions so that they can decide their future role. They must also be given some incentives and subsidies so that they can be motivated and encouraged to progress well. In this regard, it is also necessary that the government

must work for technology adoptability within the manufacturing sector and there must be an adequate and stable raw material base for the sector.

Moreover some regulatory and procedural reforms are highly required in the manufacturing sector and the government should guide monetary and exchange rate policy in a manner to support growth and development of the manufacturing sector. Thus technology adoptability, regulatory reforms and investment in research and development work are the main steps that can bring improvement in the performance of the Indian manufacturing sector (Kaliappa, 2004).

3.3.3: Malaysian Manufacturing Sector Performance

Agence (2003) reviews the performance of the Malaysian manufacturing sector and observed that 2002 brought some problems for the sector. However, after that the government implemented some economic reforms in the country that brought some hope that the sector would continue with good performance in the future. The country also faces tough competition with China and South Asian countries including Thailand and Singapore. The growth of the manufacturing sector needs some major reforms to compete with neighbouring countries as well as in the international market. Eileen (2007) disclosed that foreign investments in the manufacturing sector are increasing at a high rate and in 2006; the FDI in the manufacturing sector reached its peak and hit a record when it was increased by 13 percent and touched the level of 20.2 billion ringgit (US$5.8 billion, euro4.8 billion).

The Malaysian foreign, domestic and employment investment has shown tremendous improvement from 2003 to 2005. In 2006, the country's domestic investment was approximately RM 70 billion, surpassing both the foreign and employment investments. The Malaysian manufacturing sector is also facing some very critical issues like Intellectual Property rights, human resource management and environmental issues. Due to these problems there is some level of dissatisfaction among local manufacturers as well as among foreign investors due to which Malaysian talks with the USA also broke up without any agreement. Along with these issues the country also has to work for liberalization of the trade regime so that domestic and foreign investors can be encouraged and facilitated to invest in the country.

At present the employment offered by the manufacturing sector in Malaysia is around 28 percent; that must be increased and at the same time the contribution of the sector to the

economy is almost one-third. The government of Malaysia is also attempting to attract foreign investors to the manufacturing sector of the country by ensuring environmental certainty and a stable business environment (Eileen, 2007).

Beijing Time (2006) reported that the growth and performance of the Malaysian manufacturing sector can be examined through the fact that the sales value of Malaysian manufactured products increased by 10.7 percent and reached 0.6 billion ringgit (12.66 billion U.S. dollars) in October 2006. At the same time there was also an increase in employment in the manufacturing sector that illustrates the upward movement of the sector. The report also revealed that the Malaysian manufacturing sector now focuses a lot on the outsourcing of manufacturing activities, especially contract manufacturing, which has become the most common outsourcing activity for the Malaysian manufacturers.

The manufacturers also used to outsource logistics and technology services so that they can take advantage of the technological advancements of the other countries. It is also observed that some important steps need to be taken in order to bring further improvement in the performance of the Malaysian manufacturing sector. For example, there is a need to establish trading houses that can help and facilitate the manufacturers. The SMEs of the country are in particular need of professional assistance and they also look for some reduction in the transportation cost of raw materials and manufactured goods (Beijing Time, 2006).

Datuk (2005) observed that after the trade liberalization reforms implemented by the Malaysian government at certain times, the present situation is open for local and international investors and manufacturers and the present manufacturing sector scenario is quite open and liberal. The equity and export conditions are removed from investments and diversification projects related to the manufacturing sector. Moreover the existing manufacturers can also apply for the removal of the conditions from the business and these steps are considered very positive and supportive for the growth and development of the Malaysian manufacturing sector. Different economic reforms implemented by the Malaysian government added to the liberalization of the manufacturing industry so that now the manufacturing industry has few restrictions and trade barriers.

The country also faces tough competition at regional and international levels due to which the sector mainly looks for support from standard compliance to attain good levels of

manufacturing (Mahadevan, 2001). The Malaysian manufacturing sector faces many challenges due to the globalization and competition in the technology-driven market place. The most important challenge for the Malaysian manufacturing sector is to maintain competitiveness of its manufactured products for which the manufacturers have to ensure that they will make timely delivery of the manufactured products to international markets.

In the entire process the manufacturers have to keep in view the standards and regulations that are part of the international market. In order to be competitive at an international level, Malaysian manufacturing companies are also looking towards the outsourcing of the production and operations processes so that they can take advantage of cost effectiveness as a result of outsourcing of the manufacturing activities (Mahadevan, 2001).

Mahadevan (2001) observed that the manufacturing sector in Malaysia is required to be technology and knowledge-driven and this is a great challenge for the manufacturers; they have to prove that they are carrying out their manufacturing operations by being competitive and are updated with the latest technology. In this way innovation in manufactured products will also be assured. For this purpose an increase in research and investment expenditure is also necessary, because spending more on research and development work will facilitate new ways for the manufacturers to amend their manufacturing system.

The Malaysian manufacturing sector also faces an important issue in the availability of the skilled and qualified workforce. The international contractors have also argued for the need to bring more technical and skilled labour to the Malaysian manufacturing sector. At present the scarcity of highly qualified engineers and technicians is not acceptable by international standards and there is need to hire more professionals that can build products designed on the basis of innovation and technological advancements (Intan, 2002). The researcher also suggested that manufacturing companies hire highly technical and skilled managers externally and bring highly skilled managerial staff into the sector. In the meantime the government and the operators of the manufacturing sector have to develop long-term planning that can result in skilled labour availability in the country's manufacturing sector because external hiring cannot benefit the manufacturing sector in the long run (Intan, 2002).

When international companies become involved in the agreement with the manufacturers of some countries, they want the domestic technicians to handle the work in their

traditional manner so there must be planning for hiring and training highly technical and skilled labour in the sector. As the Malaysian manufacturing sector cannot be regarded as completely updated and advanced, so the emergence of some new technologies in the manufacturing sector like nanotechnology, grid computing, RFID, Wi-Fi, etc. have also appeared which are challenging and problematic for Malaysian manufacturers because they don't have adequate skills to cope with these advanced technologies (Mahadevan, 2001).

The researcher also feels the need for the government of Malaysia to work to support and promote of the Malaysian manufacturing sector like other developing countries. The role of the Chinese government was cited as an example that the government in China has performed a supportive role for the promotion of manufacturing sector activities and there are many trade incentives and facilities provided to the manufacturers due to which the manufacturing sector of China is booming and contributing much to the economic growth of the country. The highly competitive manufacturing market place of today requires a well-defined manufacturing policy where the manufacturers can draw benefits from different incentives and the growth of the sector could be accelerated (Mahadevan, 2001).

Intan (2002) observed that due to the high rate of capital accumulation the Malaysian manufacturing sector is input-driven rather then productivity-driven. The research reviews the performance of the Malaysian manufacturing sector and observed that the country adopted the new industrialized strategy after the 1980s and since then has put a lot of emphasis on the growth and development of heavy industry in the country. The Fourth Malaysian Plan (1980-1985) also focused on the need to promote heavy industry and the government used to allocate high capital and resources in these industries.

As a result of the mentioned plans many industries were well developed under the supervision of the government including the non-metallic mineral, ferrous (iron and steel) and non-ferrous metals, paper and paper products, petrochemicals and transport equipment. These industries were developed so that the country would then depend less on the import of products from other countries, like industrial raw materials, intermediate inputs, machinery and capital goods. The structural development in the manufacturing sector brought improvement in the situation and as a result the country became economically stable. At the same time the government and the operators of the manufacturing sector emphasized the use of advanced and updated technology within the manufacturing process. However the present situation is highly competitive and the country

is required to focus much more on issues of human resource management, recruitment of skilled labour and use of appropriate technology to be cost effective so that the Malaysian manufacturing sector can perform in the international market with stability and strength (Intan, 2002).

Mohamed (2003) threw light on some of the problems and challenges that are faced by the Malaysian manufacturing sector and concluded that the sector had a good growth rate for more than thirty years. However, there are certain problems and challenges ahead for the sector, challenges that are increasing with the passage of time. The business environment of the country is regarded as an over-regulated environment by many experts and the government is increasing its influence and interference in the business and manufacturing regime. Especially after the proliferation of Non-Financial Public Enterprises or NFPEs in 1975, the role of the government was increased in business operations and the private sector.

This phenomenon results to a great need to make the investment climate of the country better with more incentives and opportunities for growth of the private sector as well. In response to these demands, the government has also formulated such policies and strategies that can promote the investment and activities of the private sector. But some of the issues remain controversial and the private sector still has reservations on the role of the government in the perspective of the manufacturing sector's growth and development. In order to assure the growth of the manufacturing sector in Malaysia it is suggested by the researcher that the government should formulate and implement such policies that can provide new directions to manufacturers in the country by encouraging a fast and high investment rate in the sector (Mohamed, 2003).

Manufacturers are also required to increase competitiveness of their products through the utilization of technology devices and advanced techniques. There is a great need to focus on research and development so that the manufacturers can get access to the latest technology and manufacturing techniques and they can employ these techniques in their manufacturing process to assure innovation in their product design and all activities. Moreover there is also a requirement to increase the supply and quality of technical manpower and industrial skills so that the overall productivity and efficiency of the business and manufacturing sector can be improved and the sector can significantly work for the economic stability of the country (Intan, 2002).

Thus, the literature search in chapters 2 and 3 has fully analyzed the manufacturing sector in the global perspective, Nigerian manufacturing sector and manufacturing sectors of some developing countries like China, India and Malaysia and identified some gaps in the literature. The research study further selected the performance measures such as product design, manufacturing process, manufacturing strategy, manufacturing innovation and environmental uncertainty in measuring the performance of Nigerian manufacturing sector based on the importance and criticality of these measures revealed by the research. Based on the synthesis of the literature findings, the following central research question is generated:

'***To what extent does product design manufacturing systems and environmental uncertainty impacts on the performance of the Nigerian manufacturing organizations'.*** In order to answer this central research question the following sub-questions are also generated:

1. ***What was the performance of the Nigerian manufacturing sector from 1985-2009 in terms of product design, manufacturing processes, manufacturing strategy, manufacturing innovations and environmental uncertainty?***
2. ***What are the main problems and limitations faced by Nigerian manufacturing organizations?***
3. ***What are the factors that have played an important role in undermining manufacturing sector growth in Nigeria?***
4. ***What are the main differences in terms of product design, manufacturing processes, manufacturing strategy and manufacturing innovations in the Nigerian manufacturing sector as compared with that of other countries like China, India and Malaysia?***
5. ***What are the strategies and policies that can help Nigeria to cope with the technological advancements in manufacturing?***
6. ***What strategies and planning can improve the performance and productivity of the Nigerian manufacturing organizations?***

3.4 CHAPTER SUMMARY

The above discussion presented a detailed account of information related to the manufacturing sector performance of Nigeria, India, China and Malaysia. It is revealed from the above discussion that the economy of Nigeria depends upon the oil sector and fluctuations in oil prices in the global market have contributed towards the economic instability in the country. The above discussion also reviews the past and present situation of

the Nigerian manufacturing sector and identifies the core problems and limitations surrounding the sector. Moreover, the chapter also provided information about the manufacturing sectors of India, China and Malaysia separately.

It was found from the above review of the studies that in China the manufacturing sector is booming and supporting the economic growth of the country by offering employment and contributing to the GDP of the country. India and Malaysia are also doing well in the manufacturing industry; however the researchers have realized that there is a great need of increasing the contribution of these sectors in the economic growth of the country and the governments of these countries are required to implement reforms in the manufacturing industry to encourage and promote the private sector. There are some common problems also identified in the above discussion and it was found that all manufacturing sectors discussed above are facing great challenges due to globalization and high competition. In this way, the review of the literature came up with the explanation of several important issues associated with the topic of the thesis and all the background issues related to the research study become clear in the light of the above literature review.

Moreover, the major gaps identified in the literature, also discussed above so that the research study can present the discussion and analysis of these issues to fill these literature gaps. None of the researches has focused on the important factors related to the manufacturing industry like product design, manufacturing process, strategy, technology, competitiveness and environmental uncertainty. It is also found that there are few studies that have compared the performance of the Nigerian manufacturing sector with developing countries. Few strategies of developing countries have been identified by researchers that can be applied in the Nigerian manufacturing sector to bring improvement.

Another important factor missing in the above research studies is the performance of Indian, Chinese and Malaysian manufacturing sectors has not been analyzed individually or in comparison with the competitor countries. None of the researchers have compared these countries with the manufacturing sectors of the developing countries and differences between the strategies and policies of these countries and their effects on manufacturing sector performance are also not identified in these studies. The other gaps found in the literature are also filled in this research study because the research questions and objectives mainly revolve around the issues and gaps that are found in the literature.

To fill the gaps found in the related literature is the main intention that adds to the significance and need of this research study. Moreover, the examination and comparison of manufacturing sector performance is also an important research objective that is aimed at filling the gap found in the literature. These gaps found in the literature are filled with the help of primary research and the analysis of its results. In order to have adequate identification of the fact that the literature gaps are successfully filled by the research findings and analysis, the research questions are answered at the end of the research study so that it becomes clear that the pointed raised in the above discussion are successfully discussed and the requirements of the research study are also met successfully.

The above literature review has presented a detailed account of information about the past and present performances of the Nigerian manufacturing sector. It is revealed that the economy of Nigeria depends heavily upon the oil sector and fluctuations in oil prices in the global market have contributed towards the economic instability of the country. At present, the growth and performance of the Nigerian manufacturing sector is found to be in great need of reforms and improvement because the share of manufacturing sector in the country's GDP is very low. The government of Nigeria is also required to come up with support policies that will encourage and promote more private sector participation. Human resource management, technology adoptability, cost competitiveness and availability of skilled and qualified labour are some of the common challenges hindering the progress of the Nigerian manufacturing sector.

This thesis also identified some gaps in the literature. Most of the past research studies evaluated the performance of the Nigerian manufacturing sector within the boundaries of trade liberalization or technological adoptability. Also, the past researchers have only identified a few strategies that are successfully being utilized by developing countries, as these can be applied to improve the Nigerian manufacturing sector. Although, raising the level of research and development was cited by many researchers as a possible improvement strategy, there may be other cues that Nigeria can take from other developing countries. This gap in the literature should be filled in by future researches. The resulting detailed account of strategies and policies can be adopted by Nigeria to attain high quality performance of the manufacturing industry. It is also suggested that Nigerian research institutions should be well supported by the government and other public and private companies in order to conduct the researches needed to finally arrest the declining trend in the Nigerian manufacturing sector.

CHAPTER 4

RESEARCH METHODOLOGY

4.1: INTRODUCTION

This chapter describes the methodology upon which research is conducted. There are different research approaches that are commonly used, and it is necessary to select from these research methods the most appropriate and suitable methods in accordance with the topic, objectives and target respondents. Thus in this chapter, the different research purposes and approaches and types of outcomes are discussed. Then, this research is evaluated on the basis of its focus and objectives in order to find out what would be the best type and what would be the nature of its outcome. This includes the process of selecting sources of information, establishment of sampling method, data gathering technique, questionnaire construction and result calculation methods.

4.2: RESEARCH QUESTIONS

The study involves analysis, review and examination of the performance of the Nigerian manufacturing organizations during the last 25 years. There are three factors identified as performance measures to conduct this examination. These performance measures are:

- Manufacturing systems (made up of manufacturing strategy, manufacturing process and manufacturing innovation).
- Product design.
- Environmental Uncertainty.

Furthermore, the thesis presents a comparative analysis between a Nigerian manufacturing sector with those of China, India and Malaysia with the aim to improve the performance of the Nigerian manufacturing organizations. The study covers a wide range of manufacturing and design subjects and for the attainment of the research objectives in a systematic and managed manner. It is therefore necessary to organise the research objectives in terms of different research questions so that the findings of the study can be evaluated on the basis of providing the answers to the main research questions. The study is aimed to answer to the following central research question which was generated in the literature chapters: ***'To what extent does product design, manufacturing systems and environmental uncertainty impacts on the performance of the Nigerian manufacturing organizations?'***

In order to answer this central research question the following sub-questions must be answered:

1. ***What was the performance of the Nigerian manufacturing sector from 1985-2009 in terms of product design, manufacturing processes, manufacturing strategy, manufacturing innovations and environmental uncertainty?***
2. ***What are the main problems and limitations faced by Nigerian manufacturing organizations?***
3. ***What are the factors that have played an important role in undermining manufacturing sector growth in Nigeria?***
4. ***What are the main differences in terms of product design, manufacturing processes, manufacturing strategy and manufacturing innovations in the Nigerian manufacturing sector as compared with that of other countries like China, India and Malaysia?***
5. ***What are the strategies and policies that can help Nigeria to cope with the technological advancements in manufacturing?***
6. ***What strategies and planning can improve the performance and productivity of the Nigerian manufacturing organizations?***

4.3: RESEARCH APPROACH

The research approach employed the 'mixed methodological approach'. The mixed approach comprises of secondary analysis of data, statistical survey and focus group interview, all aimed at achieving the research objectives through answering the above research questions. These three research approaches are chosen keeping in view their significance and relevance to this study. The review of the literature was conducted with the intention of having deeper insight into manufacturing in Nigeria. The research work seeks to answer all the research questions of this thesis. Among these questions is the one that attempts to review the performance of the Nigerian manufacturing organizations over the last 25 years (Akinlo, 1996).

The review of the literature and the focus group interview with experts in the Nigerian manufacturing sector allowed this objective to be attained and revealed practical experiences of the experts which focused on the performance of the Nigerian manufacturing sector during the last few decades. Thus qualitative analysis of both secondary data and focus group interview with 10 experts were conducted to find out answers to the research questions.

Comparative analysis is one of the significant and commonly employed research approaches. Akinlo (1996) observed that in order to find ways for improving the economic performance of a country, it would be a better approach to compare the performance and economic conditions of that country with other developing nations so that the implacable strategies and policies of the developing countries can be identified and implemented to gain economic growth. In this way, the growth patterns of one country can help in determining the pathways for the economic development of other countries. This approach is also employed in this research and the comparison of performance of Chinese, Indian and Malaysian manufacturing sectors with that of Nigeria helped in designing the strategies for the Nigerian manufacturing sector that can take Nigeria towards the path of economic stability through manufacturing developments.

Along with the qualitative focus group interview and secondary data analysis, a statistical survey among 400 Nigerian manufacturing firms involved in the manufacturing of different consumer products was also conducted to gather quantitative information. The views of the Chief Executive Officers (CEOs) and heads of manufacturing operations in the selected organizations helped in pointing out the main obstacles to the development of the manufacturing enterprises and options for improvements. This research approach was significant for the study because it allowed collecting of practical evidence from the business world regarding the present and past performance of Nigerian manufacturing firms. The strategy adopted was that the quantitative survey research findings support the findings of the secondary research while the qualitative focus group interview further supported the research.

4.4: RESEARCH METHODOLOGY

There are three important issues in formulating research design and methodology (Creswell, 2003). Firstly, the researcher has to decide what would be the purpose of the research, secondly, what would be the process of conducting the research and thirdly, what would be the outcome of the research. Therefore, before describing the research design, these three issues are discussed in details so that the 'Purpose, Process and Outcome' of this research are decided.

4.4.1: Purpose of the Research

There are basically four types of research purposes including "exploratory, descriptive, explanatory and predictive" (Aaker and Days, 1990). In order to understand which of these

research purposes this research strives to fulfil, these four research types are explained below. Exploratory research is one of the important methods of conducting research studies. Researchers always give proper attention to this research type in order to find out the answer to their research question. It is explained by the researchers that the exploratory type of research is a significant research type that stands for the investigator just looking around regarding the necessary phenomenon, to develop suggestive ideas (Ghauri and Gronhaug, 2005).

This type of research is beneficial for conducting the research study because the main objective of this research type is to collect maximum information related to a specific problem. This research type is selected for uncommon problems or when the available information is not very reliable and absolute (Creswell, 2003). This technique is most suitable for conducting interviews (Aaker and Days, 1990). This type of research is also chosen where there is no or very little research done in the same direction for reference.

This thesis looks for ideas and patterns to gain insight and deep familiarity with the subject matter. Based on the literature review conducted in the proceeding chapters, it is found that this research work is exploratory in nature as it explores various issues that have not been unfolded in previous studies. As identified in the literature review, there are some gaps found in the literature available and this thesis strives to fill those gaps by exploring the issues that are as yet undiscovered (Creswell, 2003).

The second type of research is 'Descriptive Research'. The purpose of this type of research is to provide a description of different phenomena related to different individuals, events and situations (Ghauri and Gronhaug, 2005). The main objective is to build up empirical generalizations. It is commonly used for searching secondary data for the solution to different problem statements. It can be stated that this research type mostly deals with qualitative issues and conducting this type of research study involves the use of both primary data and literature analysis. The descriptive research also involves data collection through quantitative methods like statistical techniques that are employed for summarizing the gathered information. This thesis is not entirely descriptive in nature as it is mostly aimed at examining, analysing and exploring the issues rather than just describing them.

The third type of research is 'Explanatory Research', which possesses great importance in the context of the scientific researchers because the main purpose of the explanatory

studies is to build up a precise theory that is utilized to describe the empirical generalizations (Creswell, 2003). Mostly, this type of research is based on empirical studies and tested hypotheses that are formulated by the researchers in order to find out the solution to their problem statement (Saunders et al., 2007).

Explanatory research is also called analytical research, in which the researcher generally goes for description of the characteristics and analysis and explanation of the entire situation to find the reasons behind any incident (Ghauri and Gronhaug, 2005). This type of research strives to understand and explain the phenomena through the discovery and measurement of the casual relationship between different factors. From these arguments, clearly this thesis is also an explanatory piece of research as it is aimed at explaining different manufacturing issues in detail. Moreover, the thesis also attempts to find out the main reasons behind the decimal performance of the Nigerian manufacturing enterprises which further confirms that it is explanatory research.

The fourth type of research is 'predictive research' in which researchers generally go further in making certain statements and comments by forecasting the likelihood of a similar situation occurring elsewhere (Creswell, 2003). In this type of research, the researcher, mostly gives answers to questions like how, why and where and these questions are related to the future of the subject matter of the research and the research provides possibilities considering the findings as to what will happen in case of any occurrence in future (Saunders et al., 2007). Although this research study also gives some suggestions for the future of the Nigerian manufacturing business, it is not based on making predictions and thus not a predictive research (Ghauri and Gronhaug, 2005).

Considering the above explanations and descriptions of the research purposes it was found that this thesis is meant to be a combination of 'explanatory and exploratory researches' because it explores the issues related to the Nigerian manufacturing organizations with the help of the existing research studies supported by a statistical survey. At the same time, the research work also provided a detailed explanation of the issues linked with the research topic. Therefore, the purpose of the research was known in the light of the above descriptions and it concluded that the research study aimed at explaining and exploring the subject of the thesis with the help of different sources of data and research methods (Ghauri and Gronhaug, 2005).

4.4.2: Process of the research

After clarifying the purpose of the research the next step was to find out which research process best suited the purpose of the thesis. As discussed above, explanatory and exploratory research studies can be conducted by employing both qualitative and quantitative research approaches. For this research study, the mixed methodology was employed and both qualitative and quantitative studies were conducted to attain the objectives of the research. The mixed methodology was chosen because it is a significant method for conducting different types of research studies.

Johnson and Onwuegbuzie (2004) observed that "mixed-method kind of research draws upon the strengths of both quantitative and qualitative analysis, which enables the researcher to draw upon several methodologies in measuring the variables of the study." In this way the thesis consists of both qualitative and quantitative researches. Both research approaches are explained as follows as to their significance and importance for this research work.

Qualitative research "is a field of enquiry that crosscuts disciplines and subject matters" (Becker, 1996). Qualitative researches are mostly aimed at having deep understanding of different issues, human behaviour and the reasons and factors governing human behaviour (Creswell, 2003). In other words, qualitative research strives to find the answers why and how, rather than just where, when and what. Qualitative research is also meant to be explanatory most of the time rather than just conclusive (Denzin and Lincoln, 2000). While conducting qualitative research, it is common to use different theories, models and hypotheses.

Qualitative research is also regarded by experts as an instrument that can be used for the development of in-depth understanding of any phenomenon that can become the base for quantitative research later on (Denzin and Lincoln, 2000). As identified by Berg (1989), there are many ways of conducting a qualitative research study, including "case study, literature review, natural experiment, participant observation, interview-based, and secondary analysis of data or a combination of these." Each of these strategies "have their own advantages and disadvantages depending on the following conditions:

1. Type of research questions;
2. The investigator's control over the actual behavioural events;
3. Degree of focus on contemporary events" (Ghauri and Gronhaug, 2005).

The researcher can select from these methods according to their suitability with the research objectives. As this thesis aimed at analysing and examining the performance of the Nigerian manufacturing organizations over the last 25 years, it was necessary to look at studies conducted around this period. In this regard, the research studies that focused on the Nigerian manufacturing organizations and their performance were reviewed to get a good understanding. The most appropriate method for conducting this research was deemed to be qualitative 'secondary analysis of data', along with qualitative focus group interview with 10 Nigerian manufacturing experts.

This study assumed two qualitative research theories such as theory development and theory application that consequentially fell under the design and empirical cycles accordingly. Under the theory development, there was an exploration of the study dilemma, explanation and testing of the outcome for validity. On the other hand, the theoretical application involved diagnosis, construction and implementation of the research problem, which was manufacturing sector performance in Nigeria, Malaysia, India and China as per a study by Saunders et al. (2007). Secondary data analysis allowed the researcher to conduct the review and analysis of the secondary data and to have a critical look at the existing studies and documents related to the topic. The purpose of a focus group was to discover the attitudes, opinions, experiences and perspectives of the participants on the research topic (Kahan, 2001).

This thesis employs a qualitative research method that takes the forms of 'focus group interview" and secondary analysis of data. Highly reputable Nigerian manufacturing experts were assembled for the group interview while different secondary resources were accessed for conducting the analysis of the available secondary material related to the topic.

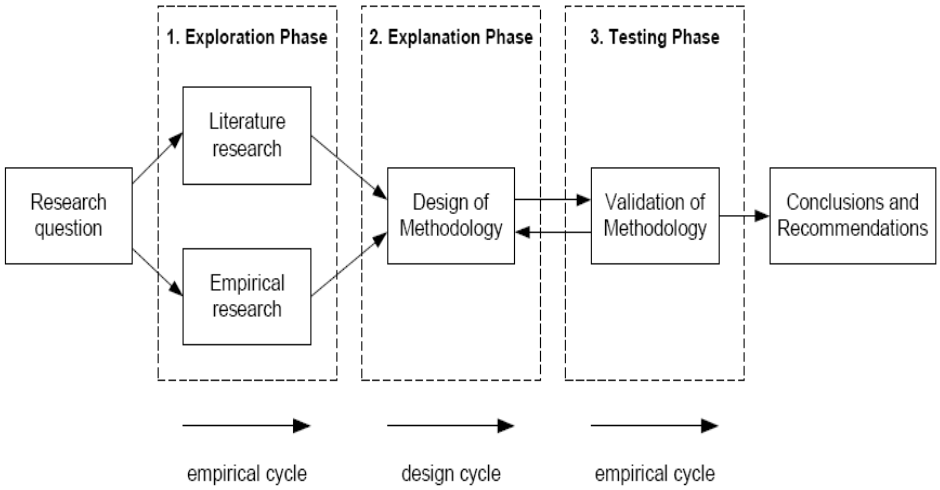


Figure 2 - Projections and unification of the study phases

Source: Saunders et al., 2007.

Research questions of this study were examined at the exploration phase by both literature and empirical research. This took place at the empirical cycle before moving to the design cycle, which is otherwise termed the explanation phase and covers the plan of study methods. Testing, which is otherwise called the last empirical cycle was involved with the validation of the research methodology applied before conclusion and recommendations were made. This research followed the plan in figure 2 above about manufacturing sector in Nigeria, India, Malaysia and China(Saunders et al., 2007).

Along with qualitative research, the thesis also employed a quantitative research methodology. Quantitative research is the "systematic and scientific investigation of quantitative properties and phenomena and their relationships. It is all about quantifying relationships between variables" (Berg, 1989). The quantitative research methods are mostly aimed at developing and employing different mathematical models, theories and hypotheses that pertain to the natural phenomena (Saunders et al., 2007). In quantitative research methods, the measurement and calculation of the result possesses central importance because through the measurement or calculation, the fundamental relationship between different empirical and mathematical expressions is established.

The quantitative research methods have been commonly used by researchers for many years and through the gathering of quantitative data, the researchers seek for information that is measurable in numbers. Graphs, tables and statistics are usually used for the presentation of the results of these types of research method and some computer software like Excel and SPSS are commonly used for the calculation of the survey results.

The researchers supporting the employment of quantitative research methods believed that through different quantitative methods applied research become scientific in real terms (Kahan, 2001). Quantitative research can also be done in different ways like polls, statistical surveys, etc. This thesis found that statistical survey was the most appropriate methods. Thus along with the qualitative study of secondary data and focus group interview with 10 manufacturing experts a statistical survey of 400 consumer products manufacturing firms operating in Nigeria was conducted to find relevant information on the research topic.

4.4.2.1: Secondary Analysis of Data – Significance and Relevance to the Research

Secondary data is "marketing research information available to researchers that they have not gathered themselves" (Claire et al., 2006). Data can be 'raw' (unprocessed) or 'compiled' (summarised). Once data has been collected, it must be evaluated for its suitability. This includes analysing its reliability and measuring any bias it may have. There are three different types of secondary data: Documentary, Survey-Based and Multiple-Source. There are many advantages of secondary data. It may have fewer requirements, it is unobtrusive, and it may allow for longitudinal studies, it can provide comparative and contextual data, it can result in unforeseen discoveries and it is permanent. However, it may have been collected for a purpose which does not match your need, access to it may be difficult or costly, aggregations and definitions may be unsuitable and the initial purpose may affect how the data is presented.

Researchers used to conduct studies on a wide range of topics by employing secondary analysis of data as the research method because this method has proven its significance as one of the most useful qualitative research techniques. It has been employed in conducting different studies for many years and different researchers have agreed upon the importance and significance of this research method. This method is relevant to this thesis because a review of studies that focused on the Nigerian manufacturing sector allows the analysis and examination of the sector by going through the historical perspective of the sector's performance (Claire et al., 2006).

Miles and Huberman (1994) explained that the secondary analysis of data basically helps to "reanalyze the data that is already compiled by other researchers and organisations to meet the requirements of their own study or database". Another way to validate the secondary date would have been a focus group interview although there are issues of costs considerations and possible group leader influence which many not bring out the true opinion of the majority of the group members.

In the light of the significance of secondary analysis of data as a qualitative research method, it was selected as one of the research approaches for this thesis. John (2000) also threw light on the significance of the secondary analysis of data, explaining that it is a significant research method used for the description of various analytical practices using the pre-existing data. This could be done either for the investigation of a new research question or for the re-examination of any of the primary study for collaboration. He further explained that in order to conduct a secondary analysis of data, the literature review is conducted from the available material in order to describe and appraise the ways in which the researcher could find the answers to the research questions.

4.4.2.2 Statistical Survey – Significance and Relevance to the Research

A statistical survey was selected as the quantitative research method for conducting the study. This statistical survey was found relevant to the thesis research objectives because it allowed collection of evidence from the Nigerian manufacturing organizations in the form of opinions of professionals working in the field. With the help of a statistical survey, it was possible to evaluate and analyse the performance of the Nigerian manufacturing organizations using the views of the CEOs and operations managers working in the manufacturing organizations.

Moreover, the survey also allowed collection of professionals' opinions about the Nigerian manufacturing sector, specifically in terms of the five variables selected for the examination of the Nigerian manufacturing organizations. There is a necessity to collect opinions regarding the five variables because the literature review has already shown that there are few studies that have focused on the study of the Nigerian manufacturing organizations in terms of manufacturing processes, manufacturing strategy, manufacturing innovations, product design and environmental uncertainty. The research study aimed at filling these gaps found in the literature.

The statistical survey appeared to be the most appropriate and suitable research method for this study and researchers have also confirmed its importance and significance in conducting quantitative research studies. Tanur (1982) explained that a statistical survey "is an efficient way of collecting information from a large number of respondents, the gathered information can be used to study attitudes, concepts, values, beliefs, and behaviours". Massey et al (1997) observed that a survey is an effective and efficient method of collecting data from a large number of respondents that allows data collection from very large samples. "The data can be used to determine validity, reliability, and statistical significance. Surveys are also considered as flexible research methods" (Massey et al., 1997) because they are standardized and easy to administer.

Abramson and Abramson (1999) clarified that the statistical survey possesses some advantages as well as disadvantages that can be experienced by the researcher while conducting research studies using the statistical survey as the research method. According to researchers, statistical surveys are a very efficient method of research that allows the researcher to collect information from a large number of respondents because study of a very large sample is possible with the help of statistical surveys (Frey, 1983). The information gathered from a large sample can easily be used for the determination of validity, reliability, and statistical significance with the help of the statistical techniques that are commonly used for the calculation of the survey results.

Surveys are considered significant because they are usually free from major errors and easy to administer at different levels. In the same way, less time and money is required to conduct a survey because the survey sampling prior to the survey allows for specifically contacting the people whose opinions are required and in this way the cost of contacting and accessing many people is saved. In addition, the specific questions related to the topic and objective of the research allow the information to be gathered in less time as focused questions and their answers are asked, recorded, codified, and analysed by the researchers with the help of the statistical survey (Frey, 1983).

Despite all of the above mentioned advantages, there are some disadvantages associated with statistical surveys. For example, the respondents' willingness, motivation, honesty, memory, and ability to respond matter a lot for successful statistical surveys. If the respondents are not interested in providing the answers to the questions due to time shortage or any other reasons, or if they are not motivated to provide accurate information,

then the survey results will also be affected. There is also a possibility that the people in the survey sample possess quite different opinions regarding the matter, than those who are not included in the survey sample due to unavailability or any other reason (Frey, 1983). In this way, the reliability and authenticity of the survey results is affected and people belonging to the same group can be found in large numbers with different opinions to the survey results. Keeping in view the significance of surveys and the requirements of this thesis, statistical survey research tool was selected and quantitative data was gathered by conducting a survey of 400 companies.

4.4.2.3: Focus Group Interview – Significance and Relevance to the Research

Focus group interview was made up of around six to fifteen people and last from around ninety minutes to two hours. Kahan (2001) pointed out that ideally focus group interview should be conducted in a non-threatening, permissive and informal environment. The key characteristic of a focus group is the interaction among the participants, with the researcher acting as a facilitator or moderator who guides the group towards the topic of interest. The purpose is to interject probing comments, offer transitional questions and cover important topics. It is important that this is done in a way as not to influence or interrupt the natural discussion of the respondents within the group.

Morgan (1997) argued that the two defining characteristics of focus group, namely the reliance on the researcher's topic and the reliance on group interaction lead to both the strengths of focus group and its pitfalls. By relying on the focus of research, large, concentrated amounts of data can be gathered which are extremely relevant to the topic of study. He backs this up by stating that two, eight people focus group can produce as many ideas as ten interviews of comparable length and within a much smaller time frame. Secondly by using group interactions as a main focus of study valuable insights are made into people's experiences, attitudes and opinions as well as the participants' comparisons of these with each other.

Morgan also argued that focus group interview can be and it has been used in three main ways. Firstly it can be used as a 'self contained method' whereby it serve as the overall source of data, here there is no requirement for other methods to help design the research or to back up the findings. Secondly it can be used as a 'supplementary source'. This applies to studies where some other method is used as a primary source such as interviews or surveys. In this case focus group is used to either help generate survey questionnaires or is

used as a source of follow up data to assist the primary data, which is useful during analysis when the researcher has queries with the findings from the primary data collection. Thirdly, a focus group can be used in a 'Multi-method' way, this refers to studies that use a combination of two or more data collection strategies, one being focus group. In this method, focus group tends to add to the data that has been collected through other methods (Frey, 1983).

In terms of the supplementary method and the multi-method, focus group can be very valuable in assisting other types of qualitative data collection. Focus group can be used in an exploratory way by conducting a small number of sessions to get an insight into the opinions, experiences and perspectives of those that will be researched. This technique is useful along side participant observation, particularly in the situation where the researcher will be entering an area that he is unfamiliar with, it is also useful to conduct a few exploratory focus group before going onto conducting individual interviews as it means that the researcher has a picture of the opinions of participants rather than relying on his own assumptions. Focus group can also be used as a follow up to interviews to further explore issues that arose during analysis (Frey, 1983).

Focus group is a particularly valuable contribution to surveys and can compliment these in three ways. First, this can capture all the domains that need to be measured in the survey on the particular topic through identifying these within the group discussions. Secondly it can help determine the dimension that makes up each of these domains. This means that when the survey is carried out, all content is covered by the questions, which also helps to ensure that the questions mean the same both to the researcher and the respondents (Morgan, 1997).

Finally the initial focus group can provide item wordings that effectively convey the researchers' intent to the survey respondents. Basically this means that confusion of questions is limited as the language of typical respondents has already been assessed. Again as with interviews, focus group can act as an exploratory data collection method after the surveys have been conducted to clarify any misunderstandings according to a study by Stokes and Bergin (2006).

What Morgan's (1997) three method approach shows is the flexible, adaptable and valuable nature of using focus group as a means of research, not only do focus group has the strength to act on its own as a research method but it also compliment the majority of other popular

qualitative data collection methods.. As well as this adaptability there are also many other qualities of focus group. The first is that it is possible within focus group to observe large amounts of group interaction and to draw up differences and similarities in opinions, experiences, attitudes and perspectives in a relatively short amount of time. This is a quality that other methods do not offer. For example, participant observation, although all these features can be observed, participant observation can be a time consuming method of research.

This can at times take weeks to generate as much data using this method as could be done in several focus group sessions. The amount and range of data collected is increased by collecting from several people at once thus making this technique more efficient. Also as well as the ability to observe vocal contributions to the discussion, it is also possible to observe the non verbal gestures such as expressions and hand movements, this can be useful for the moderator as they may be able to clarify aspects that they didn't quite understand by reading peoples gestures (Stokes and Bergin 2006).

Focus group also is more advantageous in collecting qualitative data when compared to structured or semi-structured interviews. Many focus group designs may only consist of one question which will then lead to an open discussion on the research topic. The content of the discussion is then given to the participants allowing them to evolve opinions and bounce on other contributions to the discussion (Stokes and Bergin, (2006). This is particularly valuable when conducting exploratory research when the researcher may not initially know what questions to ask. By using group interaction, those who are less inclined to comment are encouraged to make contributions by being stimulated by others comments. By speaking in a group people may also feel more comfortable to speak out than they would in an individual interview scenario.

Stokes and Bergin (2006) document Zikmund's 10 S's as the advantages of focus group research, firstly is that of 'Synergy' arguing that a wide range of information can be collected, possibly more than would be in a comparable amount of individual interviews. Secondly is 'Snowballing' whereby one person's contribution to the discussion leads to other participants opinions and experiences being discussed. Third he sees 'Serendipity' as strength in that ideas can come from what seems like nowhere, fourth, 'Stimulation' whereby respondents views are brought about by group discussion. Fifth he speaks of 'Security', people may feel more comfortable in speaking about their opinions or

experiences as there are likely to be similar types of people within the group, therefore there may be a certain degree of empathy.

The sixth S is that of 'Spontaneity', by this he refers to the fact that there is no pressure upon one individual to contribute as there would be in an individual interview, this may encourage people to speak if they have a definite point of view. Point seven refers to 'Specialization' whereby a trained interviewer can interview more people in one session and on the particular topic in mind. Eighthly is 'Structure', this means that the moderator can reintroduce a topic that has not been covered enough in other means of data collection. The ninth point mentioned is that of 'Speed' stating that this method is more efficient than individual interviews or participant observation and finally point number ten refers to 'Scrutiny', meaning that the focus group can be observed by several members of the research team to help to ensure validity and that there is no bias.

Like all methods of data collection, focus group interview has disadvantages and may not suit every type of research. The focus group setting is arguably an unnatural one, people may be less inclined to speak about matters that they may do so in private. Interactions that occur in more natural settings can not be observed within a focus group setting as it is largely limited to verbal behaviour. Even where hand gestures, facial expressions and the like are observed, they are likely to be somewhat different to those experienced in natural interactions (Morgan, 1997).

Also by observing expressions and gestures, the researcher may read into these too, for example a person may look uncomfortable because they are within a group of people they do not know but the researcher may take this as them feeling uncomfortable about discussing the topic of research when this may not be the case. Because the nature of discussion is controlled by the moderator and it is his job to probe and encourage discussion, one can never be absolutely sure of how natural the interactions are (Stokes and Bergin, (2006).

Another weakness related to the nature of focus group and the reliance on group interaction is that this very group interaction may influence the nature of the data produced, as it may affect what each individual says, people may not feel comfortable contributing if their opinion is very different to that of other participants or the group as a whole. They may feel they have to conform to the groups consensus when, if in private they may feel able to express their opinions. Polarization may also occur in which some participants may express

more extreme views than they would in private. This means that the validity and accuracy of the data is highly questionable. It is also worth considering travel time to a focus group destination, a lengthy journey may put those who have been invited off attending and therefore the group may be too small to conduct the discussion effectively (Morgan, 1997).

In summary, focus group interview is a very versatile, adaptable and valuable contribution to this research work, as demonstrated above was used as one of the methods of data collection for this research study and it also complimented, both the secondary data method and questionnaire survey to provide checks and balances and also contributed to stamping out any ambiguities, invalidities or queries that may have arisen from the two research findings in the process of achieving the research objectives (Morgan, 1997).

4.4.3: Outcome of the Study

The third important decision regarding the research design was to identify the nature of the expected outcome of the study. Shaughnessy et al., (2006) argued that there could be three types of possible outcomes of a research study, including 'applied, basic or pure and action'. When any part of the research study is conducted with the intention of bringing out the solution of any specific problem then the results or outcome of the research is expected to be applicable, because the outcome will be in the form of some suggestions or decisions that can be used for resolving issues (Shaughnessy et al., 2006).

For example, there are questions about improving the condition of any workplace, sector or community, etc; then applied research could be conducted that will specifically focus on that same community, workplace or sector and the research will analyse the situation to identify the problem and find solutions. While looking at the objectives and approach employed for this thesis, it is found that this research study is also going to be an applied research study as it is intended to bring out the solutions that can help in improving the performance of the Nigerian manufacturing organizations. In the events the research findings suggest solutions that were earlier proposed by previous studies, an investigation why such solutions were not implanted canl be used as an alternative method for this research.

The second type of outcome of the research study is called basic or fundamental research. This type of research strives to improve understanding about any general issues while the emphasis of the research does not remain on the immediate applications of the study or any facet of the issue. The outcome of the research is mostly academic in nature as it adds to the

knowledge and literature related to the topic for a general good rather than proposing the solution to any problem (Creswell, 2003). In this type of research study, the outcome might offer some discovery, invention or reflection. While analysing this research study in accordance with the basic research, it is found that this research is fundamental research because it is not only aimed at contributing to the existing literature, but it goes further in identifying and proposing the solution to the problem.

This assertion is born out of the fact that in most cases in Nigeria and indeed in Africa, previous research recommendations appeared to be unimplemented thus there is no evidence to show solutions were implemented. This may be due to the complexity of the proposed solutions as argued by Mazumdar and Mazaheri. (2003).This research proposes solutions that are simple to implement.

The third type of outcome of the study is action. In this type of research study, action is the outcome of the research as well as part of the research. Researchers attempt to interfere with the environment in which the problem exists and work out how to bring changes in the situation (Ghauri and Gronhaug, 2005). This is a common type of research in the pure science fields because the researchers often have the authority and access to interfere and make changes in the existing situation. This research work is applied in nature because the outcome of the research is in the form of practical actions, suggestions and recommendations.

4.5: SOURCES OF DATA COLLECTION

Data for the research was sourced from three ways, namely, from secondary sources, questionnaire survey and focus group interview as earlier mentioned. This research employed different secondary data sources for conducting the secondary analysis and in this regard different journals, research reports, magazines, books, electronic journals and web portals were accessed and information gathered from these sources to conduct the analysis of the available secondary data (Claire et al., 2006).

Furthermore, primary source was utilized and the responses of representatives of 400 Nigerian manufacturing firms were collected through a statistical survey technique using a structured questionnaire. Also the primary source of data included focus group interview with 10 Nigerian manufacturing experts' selected across the three regions of Nigeria. The

objective of focus interview was to gather qualitative data that could support both the quantitative questionnaire survey and also the secondary data analysis (Claire et al., 2006).

4.5.1: Survey Sampling - Criteria for Selecting Respondents and Data Gathering

Survey sampling is one of the most important issues and steps that the researchers have to conduct very carefully and systematically because the selection of the survey sample "is considered critical to the validity of the information that represents the populations that are being studied" (Claire et al., 2006, p29). The sampling of the survey determines the focus of the study on the particular level and group of people, and the researcher should ensure that there is no bias in the selection of the respondents. Ornstein (1988) observed that there are two main techniques used in the selection of a survey sample; these include the non-probability sampling approach and the probability sampling approach.

The non-probability sampling approach is also called the convenience sampling approach as it includes the respondents in the survey based on their willingness and availability regardless of their group affiliations. This method is very convenient to researchers as they can gather information from anyone whom they can access. At the same time, the level of validity is very low in this type of sampling because it does not ensure the representation of different groups and levels of people. This sampling approach was not employed for this survey because for this research study, it was necessary to have proper representation of the professionals working at key positions in the Nigerian manufacturing organizations (Ornstein, 1988).

Another approach for the survey sampling is the probability sampling approach that ensures that each of the elements associated with the research will get equal representation in the survey and responses are collected from people that specifically belong to the group under study. It is regarded as a true representation of the population; however researchers often face problems due to unwillingness, non-availability and inaccessibility of some of the respondents. According to this sampling approach, the researcher can either use simple random sampling or stratified random sampling. For this research study, the stratified random sampling approach was used as the country was divided into three zones and then samples were drawn from each zone based on the ratio of the manufacturing companies operating in each zone (Ornstein, 1988).

The following procedure was followed in selecting the survey sample using the stratified sample approach. First of all, it was decided that the source of information for the manufacturing organizations to be used for the study must come from the most authentic body of manufacturing business in Nigeria. Therefore, the Manufactures Association of Nigeria (MAN) was selected as the source for the data. MAN was established in May, 1971 as a company limited by guarantee. Furthermore, according to MAN's policy objective, "the establishment of the Association was motivated by the desire to have a focal point of communication and consultation between industry on one hand, and government and the general public on the other" (MAN, 2008).

Since its establishment, MAN has continued to be the most authentic source of manufacturing data for both government and private usage. After settling for the source of data, the next step was on the size of data, number of manufacturing organizations to be used for the research. This decision was tied down to the number of companies as per the MAN register and the geographical spread of the companies in the country. The list of companies as far as MAN's membership profile is concerned as at January, 2008 stood at 2,012 (MAN, 2008), and it was decided that 400 companies about 20% of the total membership be taken as the sample size (MAN, 2008). For this research, it was decided that MAN's zoning of the country (Nigeria) into three zones based on industry concentration be recognised and the 2,012 companies were further classified into 3 zones, namely:

1. Lagos and Western of Nigeria zone with a total of 1,026 companies or 51% of the total membership.
2. Eastern of Nigeria zone with a total of 625 members or 31% of the total membership.
3. Northern of Nigeria zone with a total of 362 companies or 18% of the total membership.

The disproportionate representation as can be seen from the percentages of the three zones is attributed to the fact that there were more friendly investment opportunities, especially in the 1960s and 1970s in Lagos and Western of Nigeria zone in addition to more developed basic infrastructures (like seaport, stable power supply (electricity) and Good roads) if compared with the other two zones. Above all, Lagos was the political capital of Nigeria until 1992 when the capital was moved from Lagos to Abuja which is in the North.

The Eastern zone is a distant second due to an array of factors which include according to Obi (1999) the enterprising nature of the Igbo tribe which forms over 50% of the population of the zone and also due to the presence of the 2nd seaport in the country located in Port-Harcourt. The North came-up with only 18% because it is in a land-locked area with no seaport and very vast land which makes inter-town trading difficult. Furthermore, the culture and tradition of the North made the area to be sceptical to any form of western development including encouraging foreign manufacturing firms to set up factories in the zone (MAN, 2008).

Again a deeper look of the companies registered with MAN, showed that the 2012 companies are grouped into 10 manufacturing groups, ranging from Food, Beverages and Tobacco, to Motor Vehicle manufacturing organizations. The details of the 10 groups are as shown in appendix A. The 10 manufacturing groups were further classified into 70 sub-manufacturing groups as shown in appendix B, with food, Beverages and Tobacco group having 17 sub-groups while the wood and wood products had the minimum sub-group of only two.

In selecting the 400 sample companies for the survey, a deliberate decision was made, which allowed the researcher to take about 20% of the total companies as per the manufacture's list, thus a total of 400 companies was the sample size considered for this research work. A further equity factor was introduced which compelled the researcher to take 20% of the companies in each of the three zones as earlier mentioned, and thus the following made up overall final sample size of 400 companies:

1. 205 companies were chosen from Lagos and Western Zone (20%) of 1,026 companies.
2. 125 companies from Eastern of Nigeria (20% of 625 companies).
3. 70 companies from the North (19% of 362 companies).

Additional measures taken when drawing up the list of the companies to be used included ensuring that only those companies that were involved in the manufacturing of consumer goods were selected. Thus the list was made up of companies in the food, pharmaceuticals, healthcare, automotive part that are consumed regularly, like bicycle and motorcycles spokes, chemical and petrochemicals industries and so on. Another check-up factor introduced was that there must be more than 50 employees working in any of the companies selected, and it must have been in operation in the field for more than five years.

So the selected companies must have been established before 2002. The companies falling under these criteria were selected for the survey and the final list of 400 firms was drawn up. It must be stated that some of the companies were quoted in the Nigeria stock exchange while others were limited liabilities. Furthermore, few of the companies were affiliates of multinationals while the majority were wholly owned locally. The key issue here was that ownership structure of the organizations was not the criteria used. What was important was that the company selected must be operational as at the time of the survey. In the event, some of the companies that were slotted in for the survey beceme in-active or proved to be inaccessible, an attempt was made to replace such a company with another from the same manufacture's list.

The next step taken was to send the developed questionnaire along with introductory letters to the Chief Executive Officers (CEO) and the heads of the manufacturing operations of the selected companies so that the respondents were the persons having a certain degree of authority to take the final decisions in their firm as these people were in a better position to provide answers to the survey questions. In this way the survey sample was selected for the statistical survey and the research work entered into the next phase i.e. data gathering.

Ghauri and Gronhaug (2005) and Grooves (1989) argued that there could be different techniques of collecting information from the survey sample. These techniques of conducting surveys include “mail, electronic email, face-to-face, telephonic interviews, online surveys and personal in home surveys. The researcher can choose from these methods according to the sample and requirements of the research objective. Each of these methods involves different cost and time for the researcher and every method possesses different levels of significance and response rate. For example, sending the questionnaire is a low cost method but requires more time, on the other hand accessing the respondents' face-to-face takes more cost in transportation, but it takes less time to collect the responses and the rate of return is also higher using this method.

The online survey is a very low cost method but for this it is necessary that all the respondents included in the survey must have access to the Internet especially in remote locations in Nigeria. For this statistical survey, the face-to-face administration method was chosen. It was also administered by the researcher with the help of four research assistants (two for Lagos and western zone and one each for Eastern and Northern zones) who were appointed by the researcher in order to assist in administering the questionnaire by face-to-

face method. In addition, some of the respondents were accessed through email by the researcher.

Ornstein (1998) revealed that the researchers can also use several techniques and methods in order to increase the response rate of their survey questionnaires. For example, they could try to keep the questionnaire short so that the respondents can be assured of spending less time in giving the answers. Long questionnaires often stop the respondents from giving answers as they have to devote their precious time. However, as per the requirement of this thesis, it was impossible to keep the questionnaire shorter because there were different issues that must be covered in the questionnaire in order to gather the opinions of the respondents about these issues in detail.

Researchers can also offer some financial incentives to the respondents by informing them that they will be paid in advance or after the completion of the survey questionnaires. However, the respondents of this survey were mostly heads of manufacturing organizations that generally have little interest in these types of financial incentives due to their positions and professional engagements, so no financial incentives was offered to the respondents for completing this questionnaire (Grooves, 1989).

Some other techniques of increasing the response rate were utilized, for example the respondents were notified prior to the face-to-face meeting about the research objective and details so that they could be mentally prepared to answer the questions and find it easy and less time-consuming to complete the questionnaires. The respondents were also convinced that the research study was aimed at bringing improvements in the situation where these professionals are working so if they positively contribute to the study and make it successful and reliable then they will also be among the beneficiaries of the research. This is because if the overall situation of the manufacturing sector can be improved at any level as a result of this research contribution, then all the people and organisations connected with manufacturing sector will be beneficiaries. For example, the respondents could use the research findings to improve the competitiveness of their products through learning additional methods in terms of product design, manufacturing process, innovations and strategy (Ghauri and Gronhaug, 2005).

The introductory letter to the selected companies, whether via email or personally delivered was a platform used to inform and educate respondents about the research purpose and

objective. Reminders were sent to the respondents via telephone and emails. Moreover, the respondents were also assured about the confidentiality of the information they provided in the survey questionnaire and the details of the respondents were not mentioned in the research reports as per the agreement of anonymity. In this way attempts were made to increase the response rate of the survey questionnaires (Ghauri and Gronhaug, 2005). The deadline for administering the questionnaire was three months.

4.5.2: Construction of the Survey Questionnaire

The questionnaire for the survey was constructed by using the Likert scale as well as traditional open-ended questions (Appendix C shows the details of the questionnaire). The questionnaire was broadly divided into 7 sections as shown below.

1. **Section I (Optional Section)–** Information about respondent's company
2. **Section II –** Information opinions about product design
3. **Section III –** Information about manufacturing process followed in the Nigerian manufacturing organizations
4. **Section IV –** Information about manufacturing Strategy in Nigerian Manufacturing organizations
5. **Section V –** Information about innovation in Nigerian manufacturing organizations
6. **Section VI –** Information about environmental uncertainty in Nigerian manufacturing organizations
7. **Section VII --** Personal background of the Respondent.

The questionnaire consisted of a total of 40 questions with section II to section VI having 7 questions each and section VII having 5 questions. Each of the 40 questions was carefully constructed so that it was devoid of any ambiguity. All questions in sections I to VI were constructed using the Likert scale which is "a bipolar scaling method used to measure either positive or negative responses to a statement" (Likert, 1932). It is a common system used in surveys. The Likert scale is also called the psychometric response scale, and it was named 'Likert Scale' after its founder Rensis Likert who described in detailed the method of using this scale and calculating the responses through this survey tool (Meyers et al., 2005).

According to the Likert scale principle, the set of attitude statements is presented in front of the respondents and the respondents are required to express the level of their agreement and disagreement using the five point scale. Each degree of agreement is denoted by a

numerical value from 1 to 5. Some of the experts also emphasize the use of a 7-point scale and 9-point scale to study the differences in opinions more deeply but the most preferred method is the usage of the 5-point system in the questionnaires (Meyers et al., 2005).

After getting all the responses, the total numerical values from all the responses were calculated for each statement. For this statistical survey, the questionnaire was also constructed using the Likert scale and by following the Likert scale, the respondents were asked to indicate their "degree of agreement with the statement or any kind of subjective or objective evaluation of the statement" (Meyers et al, 2005). Since the traditional 5-point scale was used, the respondents were asked to express their opinions about the given statement by picking the answer from the given five options:

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

These points were also rated from 1-5 where:

1. = Very High,
2. = High
3. = Medium
4. = Low
5. = Very Low

After constructing the questionnaire, the next step was to carry out a pilot test using 10 selected organizations. The purpose of the pilot test was to test the level of understanding of the questions by the respondents and also to ensure all questioners that appeared ambiguous were reconstructed. This exercise was done within the Lagos zone and there was no serious flaw observed and the questionnaire was adapted for the whole study (Likert, 1932).

The next step was to dispatch all questionnaires through the methods described earlier and after getting all the completed questionnaires, the scores for each of the questions were collected individually and the responses were summed according to the group of the items. For example, in the survey questionnaire there were five performance measures selected for the evaluation of the Nigerian manufacturing organizations. Thus the answers for each of

the questions were collected separately, and then they were summed in groups to find the collective response for each set of the questions. For such use, the Likert scale is often termed the 'Summative Scale' (Likert, 1932). Therefore, the questionnaire was mainly constructed using the Likert scale except sections I and VII that comprised of open-end questions aimed at getting detailed information about the respondents' companies and their personal background details.

The first section asked the respondents to provide information about their designations and basic data about their company. However, information generated from this section was kept confidential and not disclosed in the research report. This section was also made optional, that is a respondent may decide not to answer the section or some questions in the section. The next five sections (sections 11 to section VI) of the questionnaire were focused on gathering the opinion of the respondents regarding the performance of the Nigerian manufacturing organizations with respect to the five variables (Manufacturing process, manufacturing strategy, manufacturing innovations, product design and environmental uncertainty) selected for the study. The last section of the questionnaire consisted of open-end as well as closed-ended questions aimed at gathering data about the respondents' organizations and the personal background of the respondents (Likert, 1932).

4.5.3: Questionnaire Validation

Questionnaire validation is concerned with the extent to which the research findings accurately represent what is happening in the situation that is whether the data collected is a true picture of what is being studied (Claire et al., 2006). The responses to the questions may turn out to be highly reliable, but the results was worthless, if the questions do not measure what the researcher intended them to measure, that is validity is low (Gaglio and Katz 2001). Therefore, it was important for this research that the questions asked (although some deficiencies were noticed in some of the questions during the data analysis as acknowledged below) corresponded with the explanation given to respondents regarding the purpose of the study; otherwise, the respondents may lose interest in answering the questions as these may have appeared to be irrelevant.

In any meaningful research according to Claire et al., (2006) questionnaire validation must be established before its use. Validation is an aspect of a questionnaire development and not of its use in the solution of the problem. Invalidity is not restricted to the instrument itself. It can also result from systematic error to coding or interpretation, or from biased

orientation of the directions. Validity is a key element that concerns this researcher especially when trying to carry out research analysis from the data generated. In short, validity is about whether a test (or measure of any kind) is really measuring the thing the researcher intended to measure.

It is hereby acknowledged that there could be gaps in some of the questions wording which is critical in eliciting representative responses, as a dull or leading question will bias the answers given. Source of bias in question design as identified by Owojori (2005) include:

a) Questions which start with words meant to soften hardness or directness
b) Questions which contain conditional or hypothetical clauses
c) Two or more questions presented as one
d) Questions that contain difficult or unfamiliar word and
e) Questions which contain one or more instructions to respondents.

Despite the evidence of similar use of almost all the questions in the questionnaire by previous researchers, this researcher acknowledges that there appeared to be gaps in some of the questions which came into limelight during the analysis of the data obtained in Chapters 5 and 6. However, this did not affect the quality of the research result obtained, although it made the process a little more difficult because more than one step analysis was applied (Owojori, 2005).

Manufacturing researchers in Africa like Mazumdar and Mazaheri (2003) and Dipak and Ata (2003) have attempted to develop measures of manufacturing phenomena that are as valid as possible. There are several forms of validity approaches that should be taken into account when developing or testing measures of manufacturing phenomena. It is equally worth mentioning that all types of validity have limitations and should be considered as ways of increasing the validity of measures rather than as methods that provide a guarantee about the validity of measures. Some forms of validity approaches according to Frese and Kruif (2000) are face validity; construct validity, ecological validity and population validity. Each one is discussed below.

Face validity approach: Face validity approach is the simplest form of validity used by researchers. It involves making a subjective judgement about whether questions appear to be measuring what the researcher intended them to. Although simple, this is actually a very worthwhile process to engage in when developing a test. It is surprising to come across a

test that clearly lacks face validity. People can become so involved in their theories and processes in test construction that they miss the bigger picture about whether the test items are plausible or not (Gaglio and Katz, 2001). This research subscribed to this form of validity and hence adopted most of the questions that were used in previous studies without any further validation.

Criterion validity approach: Criterion validity is concerned with whether the test gives results in agreement with other measures of the same thing. There are two main types of criterion validity - concurrent and predictive. Concurrent validity involves comparisons of a new test with an established measure of the same construct. Predictive validity is where the researcher evaluates whether his/her test is predictive of some appropriate future event (Frese and Kruif, 2000).

Construct validity approach: This form of validity is concerned with whether a measure actually taps the concept being studied. There is no very simple way of establishing construct validity. At the simplest level face validity may be considered a type of construct validity even if general treatment in on a distinct type of validity with similarly, predictive criterion validity may be understood as a method of establishing construct validity. Pilot testing is the most known method of construct validity and it is one of the two questionnaire validation approaches that were adopted by this research. Pilot testing validation is further discussed in this section (Gaglio and Katz, 2001).

Ecological validity approach: Ecological validity is being increasingly examined in research studies. This is because a great deal of research has been modelled on the natural sciences and therefore conducted in laboratories (Frese and Kruif, 2000). The worry with this approach is that these studies may lack ecological validity. The question can be whether the results gathered in a laboratory about some phenomenon will generalise to other settings or places (Frese and Kruif, 2000). Would participants behave in the same way outside the laboratory as they do when subjected to a study within a laboratory setting?

Population validity approach: Although population validity is not commonly referred to in the research literature, it is still worthy of mention. This type of validity is commonly a problem report-based research, for example in journalistic reporting when, for instance, journalists make claims about all people on the basis of research on a particular group of

people. There is a danger in simply believing that research findings on a small sample of people will generalise to all members of the population from which the sample came (Claire et al., 2006). This researcher was cautious about making claims of this kind. Effective methods of sampling are one important way of trying to increase the population validity of a study.

The actual validation of the questionnaire utilised the same principles and procedures as the validation of any instrument of tests and measurements. At the most elementary level, it was necessary for the questionnaire to have face validity. This mean that each question must be related to the topic under investigation; there must be an adequate coverage of the overall topic; the questions must be clear and unambiguous; and so on. A more adequate validation, however, requires checking the responses which the questionnaire elicits against an external criterion. For example, factual questions about age and educational background can be checked against the records. On the other hand, it is somewhat more difficult to locate an adequate criterion for questions of opinion and attitudes. A possible solution is to follow the questionnaire with an interview of a sample of the respondents to see whether their responses to the questionnaire actually represent their views on the subjects discussed (Gaglio and Katz, 2001).

In certain cases, it is possible to validate questionnaire responses against actual behaviour. However, a respondent may be willing to divulge his feelings in response to a questionnaire item and yet suppress such feelings in his behaviour in a face to face contact. Establishing validity is even more complicated in questionnaires where the interpretation of the responses constitutes an added source of unreliability and invalidity. In some instances, the greater flexibility of the questionnaire may promote greater validity in the responses, but it also increases the possibility of invalidity of tabulation (Owojori, 2005).

It has been found that requiring signatures in answering questions in surveys tends to inhibit honesty and frankness (Gaglio and Katz, 2001). However, for certain questions, requiring signatures will not make any difference. For certain general questions there may be no bias introduced, but it should be borne in mind that there should be no all-inclusive generalisation that the identification of the respondent is irrelevant from the standpoint of the validity of his/her responses. Requiring signatures when sensitive questions are involved does inhibit honesty and frankness in filling out the questionnaire (Claire et al., 2006).

Pilot testing validation, which falls under the construct validity approach of the questionnaire, took the form of survey of 10 manufacturing organizations. They collectively failed to see any major way in which it could have been improved. On reflection, this could have been because it is perfect if the questions are simple and unambiguous or could have been a lack of understanding of the subject or my objectives of the research (Gaglio and Katz, 2001). Thus, the questionnaire remained unchanged for the research. However, the questionnaire was worded and terminology used in such a way that meant their completion could be done without guidance. This needed to be the case as the researcher wasn't always present at the time of completion of the questionnaires although in over 85%, the researcher's assistant was physically present.

The pilot testing which was done in three regions of Nigeria appeared to be inadequate in the course of the full sample analysis in Chapters 5 and 6 because results obtained especially as related to challenges facing the manufacturing organizations, appeared not very sufficient which was attributed to the fact that the pilot testing was done only once and the result obtained was thus assumed to be sufficient. However, pilot testing should be done at least twice or more specifically if the sample size was diverse according to Margaret (2004), even if during the first satisfactory result was obtained.

In the case of this research, the 10 organizations chosen were assumed to be a typical representative sample of all Nigerian manufacturing establishments. Therefore construct validity was not anticipated to be a challenge to this research and hence there was no effort to re-conduct the pilot testing as recommended by Margaret (2004). Again as a further crosscheck of the data generated, additional information that relates to manufacturing performance of the organizations selected like in terms of new products initiated or improved, capacity utilization, machinery acquisitions/upgrade, sales volume etc were requested from the respondents.

Where contradictory information was found, further clarifications were asked from the respondents by the researcher or by the research assistants employed by the researcher in each region. Also, the researcher in several cases had to revisit some of the respondents for the second time in order to establish the authenticity of the initial data generated. In some cases, as part of construct validity, the researcher engaged in face to face, email and telephone discussions with respondents on the answers they provided in order to cross check the pattern of the answers. Where contradictions were found, the respondent was

subjected to some proven questions and in some cases answers provided were validated with information available on the directorate of manufacturers Association of Nigeria (Gaglio and Katz, 2001).

4.5.4: Sample Survey Population for the Questionnaire

A stratified random sample of 400 manufacturing establishments was drawn from a certified list of business names provided by the directorate of Nigerian Manufactures Association. The questionnaires were administered to CEOs and Head of Manufacturing departments of the chosen organization. The dates the questionnaires were administered were between 5th November 2009, and 30th January 2010. Thus deadline for completing data gathering was decided after three months and within this period there were 264 responses collected from the respondents.

Out of 264 questionnaires 10 were rejected because the information provided in these questionnaires was either not completed by the respondents or the information provided in the returned questionnaires was unclear. Finally there were 254 completed questionnaires accepted for the survey result compiling and further calculation and analysis. Almost half of the manufacturing companies of Nigeria are located in Lagos and the western area so there were more than half of the selected manufacturing companies in this region. The response rate was also high from this region and there were in total 162 manufacturing companies of the Lagos and West Area that took part in the survey and returned the completed questionnaire within the given time.

Along with that 42 and 50 manufacturing companies operating in the North and East areas respectively returned the completed questionnaire within the agreed deadline. The responding firms are involved in the manufacturing of different consumer goods and out of 254 responding manufacturing companies, 64 firms operate in the food industry, 56 in the healthcare and pharmaceuticals industry, 26 firms in the automotive industry – mainly bicycles and motorcycles, 18 firms in the chemicals and petrochemicals sector, 24 firms in agricultural products farm implements, seed processing, fertilizer blending, 56 firms in the manufacturing of plates, containers, etc. and 10 operate in manufacturing of different other consumer goods.

The CEOs and operations officers of the responding firms were mostly requested to take part in the survey and finally there were a total of 94 CEOs of the manufacturing firms that

took part in the survey. Moreover there were 16 chief operating officers, 134 Heads of Operations departments and 10 managers and communication officers who completed the questionnaires on the behalf of their companies. In this manner the data is gathered from 254 firms and then placed in statistical software including SPSS and Excel for calculation and further analysis.

4.5.5: Focus Group Interview - Criteria for Selecting Participants and Data Gathering

The process of selecting the 10 focus group interview participants was mainly based on their knowledge and experience which includes academic background, number of years spent in manufacturing function, number of countries worked (interest was placed on those that worked in China, India and Malaysia), and geographical spread within Nigerian regions including working experience in multiple sub-sectors of the Nigerian manufacturing sector. An initial list of 30 people was compiled from the directorate of manufacturing enterprises of the Nigerian manufactures association and after a series of screenings including telephone contacts and emails with short listed people; a list of 10 participants was made. These participants all agreed to take part in the focus group interview at an agreed date and venue.

All 10 participants had between 25 to 40 years work experience in the manufacturing business. More specifically two out of ten participants have more than 10 years each at senior management level working experience in the Chinese footwear and pharmaceutical manufacturing sectors while two other participants each had more than 15 senior management work experience in the Indian pharmaceutical and automotive manufacturing sub-sectors. Also one of the participants had 20 years management experience in the Malaysian petrochemical manufacturing sub-sector. In terms of local Nigerian manufacturing experience, all of participants had more than 15 years executive management experience in multiple subsectors in Nigerian.

Additionally, two of the participants have 10 years each of teaching experience that relates to manufacturing in various Nigerian universities. The researcher sponsored a venue that looks central to all the 10 participants and their travel expenses to the venue were fully paid by the researcher, although majority sponsored themselves. The participants agreed that the details of their discussions be taped and it was done. The data generated is analyzed as shown in chapters five and six.

4.5.6: Construction and Validation of Questionnaire for the Focus Group Interview

To conduct the focus group interview with the 10 selected manufacturing experts, a semi-structured interview technique was used. But before conducting the final face to face group interview, pilot testing was done using 2 out of the 10 experts before the questions were agreed. After each question, the group interviewees were allowed to answer the question using their own initiative. Where the answer appeared to be ambiguous or off target for the research, further probing questions were asked. Also each participant was allowed to make comments on other respondents' expressed views.

In order to maintain some level of confidentiality and also to protect personal and business interests of the interviewees, their real names were shielded and some codes were used which identified them without disclosing their real names. The coding that was used is as follows:

Expert 1 (participant 1) is coded as	=	MENP 1
Expert 2 (participant 2) is coded as	=	MENP 2
Expert 3 (participant 3) is coded as	=	MENP 3
Expert 4 (participant 4) is coded as	=	MENP 4
Expert 5 (participant 6) is coded as	=	MENP 5
Expert 6 (participant 7) is coded as	=	MENP 6
Expert 7 (participant 8) is coded as	=	MENP 7
Expert 8 (participant 9) is coded as	=	MENP 8
Expert 9 (participant 10) is coded as	=	MENP 9
Expert 10 (participant 10) is coded as	=	MENP 10

An interview questionnaire that had a total of 15 open-ended questions was used (See Appendix D for a copy of the instrument). The questions were targeted at investigating the role of product design, manufacturing process, manufacturing strategy, manufacturing innovation and environmental uncertainty in the Nigerian manufacturing organizations. It also makes a comparison of the Nigerian manufacturing sector with those of China. India and Malaysia as regards to the method these countries followed to become successful as perceived by the interviewees. The questions covered areas including participants' background and manufacturing experience, factors that are impediments to Nigerian manufacturing organizations, economic contributions of the Nigerian manufacturing sector, and comparison of Nigerian manufacturing sector with those of China, India and Malaysia. For example, questions 1, 2, 3, 6, 11, 14 and 15 are as stated below:

1. **Question 1:** Distinguished participants, can you briefly introduce yourselves with special emphasis on your local and international manufacturing experience as it relates to product design, manufacturing process, manufacturing strategy, innovation and environmental challenges in the Nigerian Manufacturing sector?
2. **Question 2:** What factors do you think play the most important role in impeding effective Product design, adequate manufacturing process, manufacturing strategy and innovation within the Nigerian Manufacturing sector?
3. **Question 3:** What are the major environmental challenges currently facing the Nigerian manufacturing companies?
4. **Question 6:** What are the key factors confronting the manufacturing firms of Nigeria in maintaining high performance at domestic level?
5. **Question 11:** Based on your knowledge and experience, to what extent do you see the level of difference in the performance of Nigerian manufacturing sector as compared with those of China, India and Malaysia in terms of product design , manufacturing process, manufacturing strategy , Manufacturing innovation, and environmental uncertainty?
6. **Question 14:** Based on your knowledge and experience, to what level can the Nigerian manufacturing sector improve by following the policies and strategies of manufacturing sectors of these developing countries?
7. **Question 15:** What are your recommendations and suggestions that the Nigerian manufacturing sector has to emphasise, which will bring improvement in the overall state of the Nigerian manufacturing sector?

4.6: BASIS FOR DATA ANALYSIS AND METHODS FOR RESULTS CALCULATION

The researcher applied research onion diagram method to aid data analysis on the Nigerian, Chinese, Malaysian and Indian manufacturing sector. Research onion presents a coherent way of research analysis and is supported by many scholars according to a study by Saunders et al., (2007). The research onion therefore covers time frame, choices, research strategies, approaches and philosophies that assist in analysing the results efficiently.

After the field survey sampling, selecting the method for analysis of data collected was the next important step so that the calculation of the survey results can be analysed and interpreted. As decided earlier, all of the results and responses related to the performance of the Nigerian manufacturing organizations were analysed based on five performance measures that dad been selected for conducting the analysis and examination of the Nigerian manufacturing sector performance.

Data gathered from the questionnaires was placed in the statistical software that was designed especially for the calculation of the survey results and for creating graphs and diagrams like SPSS and Excel. Data was analysed based on the score obtained by each of the statements as the score showed the level of agreement of the respondents with that particular statement. There were six sections of the questionnaire that were constructed using the Likert scale. Each question in the six sections was calculated separately and then the whole questions of each of the section are calculated collectively. This was done in order to find the overall pattern of the respondents' answers that related to the Nigerian manufacturing organizations.

Results for the focus group interview were qualitatively analysed. After calculating all the responses for each of the sections in the survey, the sum of all responses was used for making relevant graphs and diagrams to give a clear understanding of the survey results and to allow a quick look at the survey results.

The answers gathered for each section were compared with each other to find out if the Nigerian manufacturing organizations performance was weakest with respect to the selected performance factor. It involved finding which of the factor is considered strongest by the respondents in the performance of the Nigerian manufacturing organizations in each of the section. Also, the results of the focus group interview that contained the comparative analysis of the Chinese, Malaysian and Indian manufacturing sectors were qualitatively analysed and compared with that of Nigeria in order to find out which, in the opinion of the participants, of these three countries was performing better than Nigeria with respect to the five selected performance measures.

4.7: ETHICAL CONSIDERATION

This study held mutually to the universal and neighbouring moral research requirements, such as the appraisal from moral study commissions. The study similarly was acknowledged by the worldwide study panel to confirm that regular moral measures were held before the commencement of data collection. These ethical issues included were safety, endorsement, confidentiality among others. The study obtained authorized approval from the stated legal study bodies before the beginning data gathering about manufacturing and economics in Nigeria, China, Malaysia and India. The significance of considering ethical issues is to create an environment of trust between the researcher and the respondents, and hence the collection of adequate data (Saunders et al., 2007).

Since ethical issues are an important consideration for any research, these concerns were closely addressed in the application for, and later in the approved application for, ethics clearance, which follows the format set out by the University of Southern Queensland. The condition made in this approval was closely adhered to and endorsed in this research. Appendix E is a copy of the approval confirmation by the Human Research Ethics Committee from the University, which is equally important to note. "In the context of research, morals refer to the suitability of one's behaviour in relation to the rights of those who become the subject of your work, or are affected by it" (Saunders et al., 2007). Ethical concerns must consider issues such as plagiarism, honesty of the data and the privacy of the subject.

Whilst designing and conducting the research, the respondents must be kept informed of the aims of the research as well as ensuring their confidentiality at all times. Only respondents that gave their consent were approached throughout this research. Also any information that could reveal their identity was not used thorough out this research. Finally, on deciding the approach to use it is important to consider views expressed by Margaret (2004) who argued that the needs, interests and preferences of the researcher are typically overlooked but are central to the progress of fieldwork.

4.8: CHAPTER SUMMARY

This chapter considered the methods that were applied in conducting the research. The main theme of the research was to examine the performance of manufacturing sector in Nigeria, Malaysia, India and China. In a bid to adequately evaluate the performance of the manufacturing sector in Nigeria between 1985 and 2009 in terms of product design, manufacturing processes, strategy, innovations and environmental uncertainty, there was a need for the incorporation of better study methodology according to Saunders et al. (2007).

Two research approaches were used in this study, which included both primary and secondary methods of data collection. The primary method of data collection involved the incorporation of questionnaire survey and focus group interview. On the other hand, the secondary method of data collection consisted of analysing the documented materials relating to manufacturing and economics in Nigeria, Malaysia, China and India. Among the issues that were considered in the methodology were the major predicaments and limitations that the Nigerian manufacturing sector has been facing (Saunders et al., 2007).

The initial stage involved the review of previous literature and studies about the manufacturing sector in Nigeria, especially between 1985 and 2009. Then there was the

formulation of the conceptual framework of the study, which included the theories and variables of the manufacturing sector in Nigeria during that period. The developed theories of the performance led to qualitative interview, which formed the primary phase of focus group interview that was followed by content analysis. The analysed contents regarding the performance of manufacturing sector in Nigeria assisted in the generation of the questionnaire that were distributed to about 400 companies that are duly registered and have been operating in Nigeria between 1985 and 2009 (Saunders et al., 2007).

There were about 1,026 feasible companies in Lagos and Western Zone, but only 20%, which accounted to only 205 companies were used as the appropriate sample. Another 125 companies from Eastern Nigeria that accounted for 205 of 625 companies were used and 70 companies from the Northern part, which comprised of 19% of the total 362 feasible companies. In this chapter, the study ensured that all the companies that manufacture consumer products were identified. These included companies dealing in health issues, pharmaceuticals, food, automotive parts, such as bicycles, motorcycle spare parts, Petrochemical and chemical industries as per study by Saunders et al. (2007).

Another consideration for choosing the best companies was the number of employees. Only companies that employed more than 50 people and had been operational for more than five years were considered for the sample in order to produce logical results of the performance of manufacturing sector in Nigeria. The companies were chosen from all over Nigeria in order to validate the results. After the generation of questionnaire, there was the translation and pretesting of the questionnaire to ensure their significance in the evaluation of manufacturing sector of Nigeria (Saunders et al., 2007).

These questionnaires were then sent to the Chief Executive Officers (CEOs) and Heads of Departments of the selected manufacturing companies, which were filled and returned for data compilation and analysis. In the translation and pretesting phase of the questionnaire, there was scale purification and initial test of validity and reliability of the identified questions in order to minimise ambiguity in results. After the validation stage, there was a real fieldwork where data collection took place before appropriate analysis was done on the factors that play a major role in destabilizing the manufacturing sector in Nigeria among other issues.

This study assumed the application of “Research Onion” in data analysis. Research onion covers almost all the required phases of research, which comprises of time horizon, choices,

strategies, approaches and philosophies. Since this research assumed both qualitative and quantitative approaches, the application of philosophies such as positivism, realism, objectivism, subjectivism, radical structuralism and radical humanism among other were of great significance. This phenomenon ensured that the data concerning the performance of Nigerian manufacturing sector was adequately collected, analysed and compiled.

This chapter discussed all the points related to the research methodology employed for conducting the study. All decisions regarding the research method were taken. Different purposes for conducting the research studies were considered and it was found that this research was going to be an exploratory and explanatory. The research strived to find the solution to a problem and at the same time described and explained several manufacturing issues in detail. The mixed methodology was selected for the research and secondary analysis of data and statistical survey' were selected as the most appropriate research methods for the study.

In the same way, the clarity of the study will come up with applied results or outcomes because the research proposed some suggestions and recommendations for the improvement of the performance of the Nigerian manufacturing business. This was contrary to the ones described and explained the earlier (Saunders et al., 2007). The survey sampling method for data gathering and questionnaire construction using the Likert scale was also explained in this chapter and finally all t details regarding the steps and procedures involved in conducting the research from beginning to end have been explicitly described.

CHAPTER 5
RESEARCH FINDINGS

5.1. INTRODUCTION

This chapter contains the detailed description of the research findings. There are three types of methodologies employed for the study, including the secondary analysis of data, the statistical survey and the focus group interview. All of these approaches aimed at exploring and explaining different issues and aspects associated with the topic of the thesis. Following are the key findings derived from both secondary and primary research methods.

The secondary research was conducted by analysing and reviewing the literature available on the topic. The secondary research was divided into two parts. In the first part of the literature review, information about the manufacturing industry, its beginning and its importance for economic growth were studied.

Moreover, the three performance measures - product design, manufacturing systems and environmental uncertainty - were studied to understand their contribution and importance for the manufacturing industry and to explain the reasons behind the selection of these measures for evaluating the performance of the manufacturing organizations. In the second part of the literature review, the thesis specifically focused on the performance and history of Nigerian manufacturing sector and its contribution to the national economy. Further, the manufacturing sectors of China, India and Malaysia are also discussed in detail to prepare the background for a comparative analysis of the manufacturing sectors of these developing countries with that of Nigeria.

The quantitative primary research, i.e. the statistical survey, was conducted with the help of a structured questionnaire that was divided into different sections to obtain comprehensive information about each and every aspect of the issue. The survey received responses from CEOs and Heads of Manufacturing Departments from 254 selected organizations. This chapter presents the results of the statistical survey separately for each question and then collectively for every section.

Focus group interview in the form of qualitative primary research was also conducted with 10 experts from the manufacturing industry. The group interview was conducted using a

questionnaire with 15 open-ended questions, which aimed at investigating the role of product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty in the Nigerian manufacturing sector. The questionnaire also aimed at comparing the performance of Nigerian manufacturing sector with those of China, India and Malaysia. The individual and collective results of the questions were explained and also presented through graphs in this chapter.

The chapter also dwells as to how well the primary and the secondary research methods employed in this research complimented each other, by linking their key research findings. Further, the chapter highlights the gaps in the literature, identified from the secondary findings. These gaps were duly filled with the help of an in-depth analysis of the statistical survey questionnaire and the opinion of the experts from the focus group interview.

5.2 KEY FINDINGS FROM THE QUESTIONNAIRE SURVEY

The primary research conducted for the study was thoroughly a statistical survey. The sample for this survey comprised of 400 companies involved in the manufacturing of different consumer goods in Nigeria. A questionnaire was sent to them in-person as well as through e-mail. After the deadline of three months, 264 responses were collected; out of these 10 were rejected and 254 were finally accepted for calculation of the results. As the questionnaire was divided into different sections to individually focus on each and every aspect of the issues, the results of the survey were also calculated separately for each question and each section.

These results are presented according to the sections of the questionnaires. Six sections of the questionnaire (excluding sections I and VIII) were constructed using the Likert scale and the respondents were requested to select the numerical value for each and every given statement to show their degree of agreement with that statement. The respondents were asked to express their views about the matter in the given statements as 1= Very High, 2= High, 3= Medium, 4= Low, 5= Very low. The responses received for each of the values were calculated and presented in the results according to the meaning of that numerical value to show the level of agreement of the respondents. *For example if there were 34 responses received for the value 1 then it was stated in the results that 34 respondents graded the expression in the given statement as Very High and so on. The last section consisted of both open- and closed-ended* questions and the results are separately considered for each of these questions.

5.2.1 Section I – Information about Respondents and their Organizations

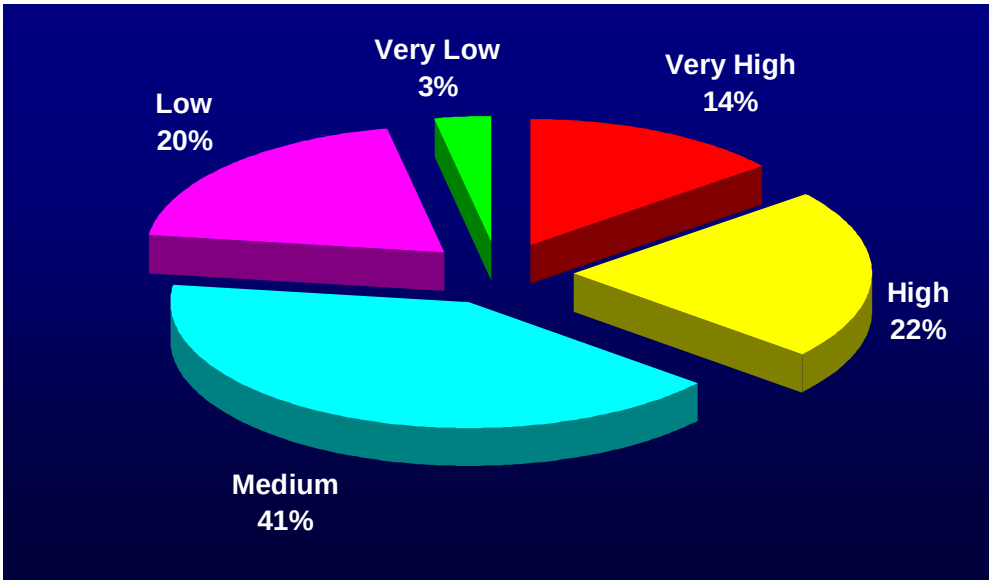
In the first section of the questionnaire, the respondents were asked to complete the fields in order to provide the information about their company, designation and contact information. Before conducting the survey the respondents were assured of the confidentiality of their personal details and information provided in the questionnaire thus the details gathered from the first section were not disclosed in the research report as per agreement of anonymity made with the respondents. Though the details of the respondents are not disclosed in the research report, it is obvious that all of the respondents who participated in the survey were in responsible positions at different manufacturing companies operating in Nigeria (involved in the manufacturing of different consumer products like food items, pharmaceuticals, agricultural products, plates, containers, chemicals and petrochemicals etc). The CEOs, heads of the operations and manufacturing departments and communication officers of these companies participated in the survey and although most of these manufacturing firms were located in Lagos, some were selected from the eastern and western areas of the country.

5.2.2 Section II – Opinions about Product Design

There are a total of seven questions included in the second section of the questionnaire and the respondents were asked to express their views about the Nigerian manufacturing sector, in terms of product design. The results of these seven questions are presented below:-

Question 1: ***How do you evaluate the skills and technical capabilities of Nigerian labour in the perspective of maintaining high level of product design and quality of the products produced in the Nigerian manufacturing sector?***

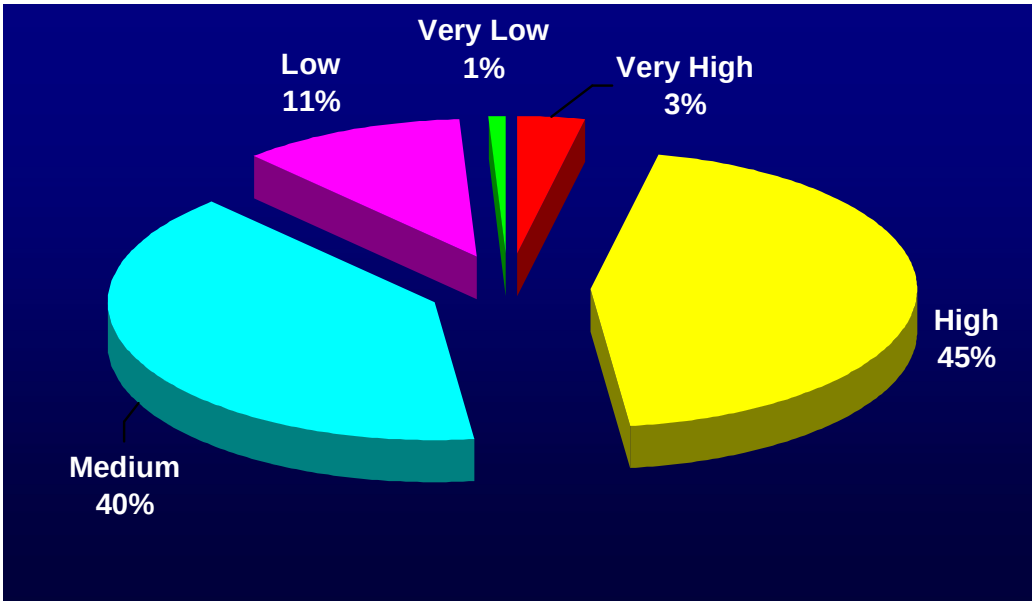
36 (14%) of the respondents replied Very High, 56 (22%) said High, 104 (41%) said Medium, 50 (20%) said Low and 8 (3%) said Very Low. Thus the results of the survey revealed that many of the professionals working in the Nigerian manufacturing organizations regarded the skills and technical capabilities of Nigerian workers at the medium level. The result is also shown in graph 11 below.



Graph 11: Skills and technical capabilities of Nigerian labour from the perspective of maintaining high level of product design.

Question 2: ***In your view what is the level of Nigerian companies' concentration on product design and is that level enough to improve the performance of the Nigerian manufacturing organizations in terms of high productivity and revenues?***

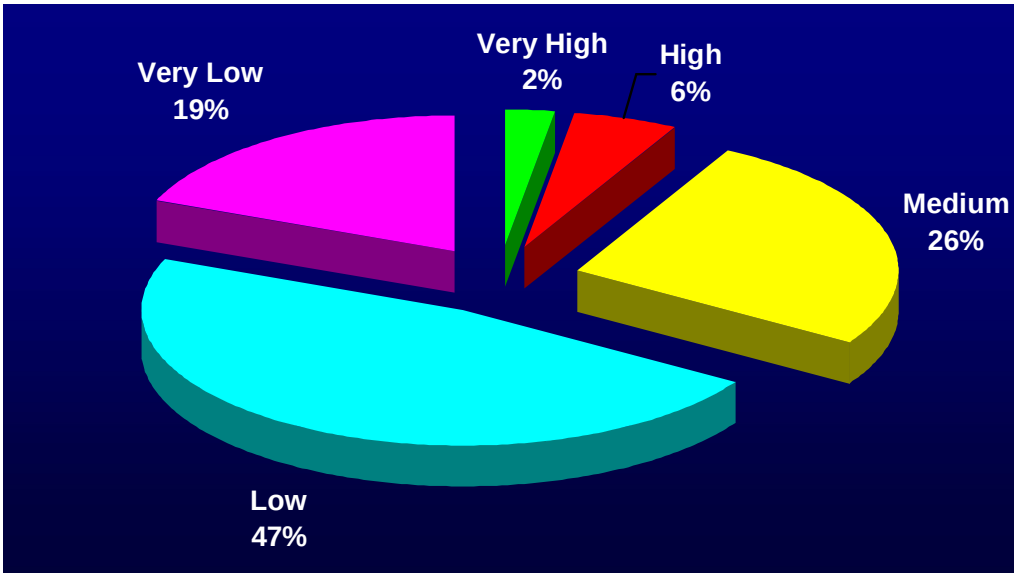
8 (3%) of the respondents that replied Very High; 112 (45%) said High, 100 (40%) said Medium, 28 (11%) said Low and 2 (1%) said Very Low. Thus it was found that the respondents of the survey agree that the Nigerian firms were focusing highly on product design. The result is also shown in graph 12 below.



Graph 12: Level of Nigerian companies' concentration on product design in terms of productivity and revenues

Question 3: ***How do you evaluate the products designed by Nigerian consumer goods manufacturing companies at an international level?***

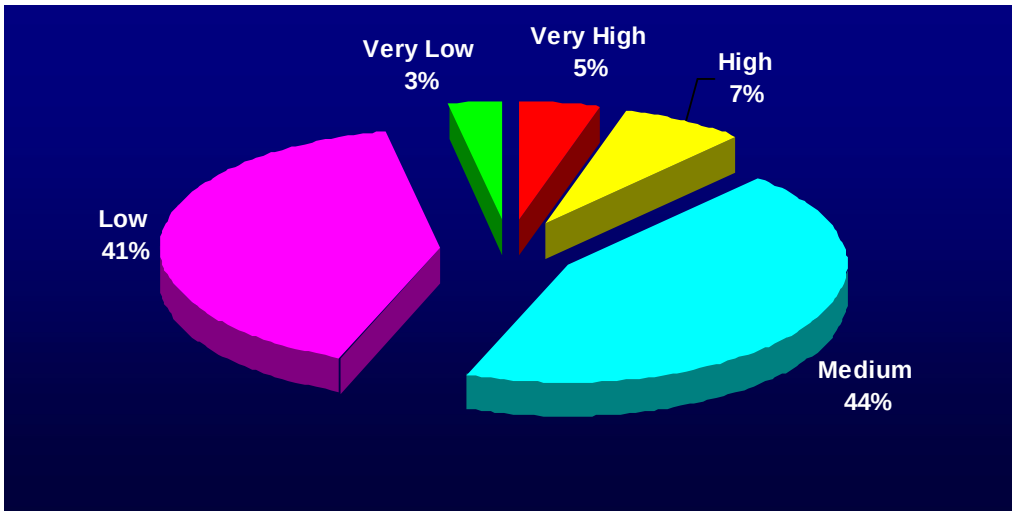
6 (2%) of the respondents said Very High, 14 (6%) said High, 66 (26%) said Medium, 120 (47%) said Low and 48 (19%) said Very Low. Thus it is clear from these results that most of the respondents had the opinion that at an international level the product designing of the consumer goods manufacturing sector in Nigeria was at a very low level. The result is also shown in graph 13 below.



Graph 13: Evaluation of the products designed by Nigerian consumer goods manufacturing companies at an international level

Question 4: ***Whether the Nigerian consumer sectors' product designers have the potential to generate unique and competitive ideas and concepts for product design?***

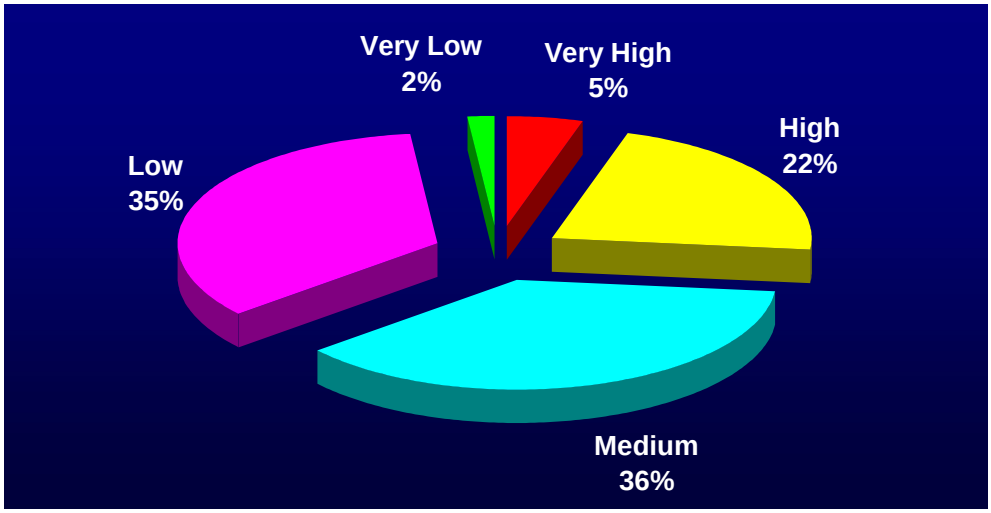
12 (5%) of the respondents said Very High, 18 (7%) said High, 112 (44%) said Medium, 104(41%) said Low and 8 (3%) said Very Low. It was discovered from these results that the respondents of the survey saw a very low level of potential in Nigerian product designers to manufacture products with unique and competitive designs. The result is also shown in graph 14 below.



Graph 14: Potential of the Nigerian consumer sectors' product designers to generate unique and competitive ideas and concepts for product design

Question 5: ***What is the trend among the manufacturing companies to do adequate research to determine the demands and expectations of the consumers before the product design process?***

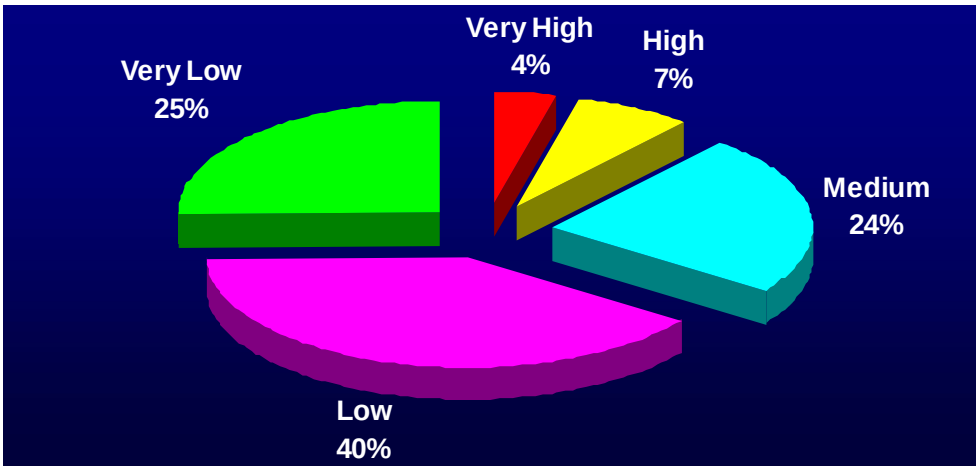
12 (5%) of the respondents said Very High, 56 (25%) said High, 94 (37%) said Medium, 88 (35%) said Low and 4 (1%) said Very Low. These results show that most of the respondents of the survey believed that the research work trend level was very low among the manufacturing companies of Nigeria. The result is also shown in graph 15 below.



Graph 15: Trend among the manufacturing companies to do adequate research to determine the demands and expectations

Question 6: ***How do you see the present product designs of Nigerian consumer products assisting the country to compete at the domestic and global level?***

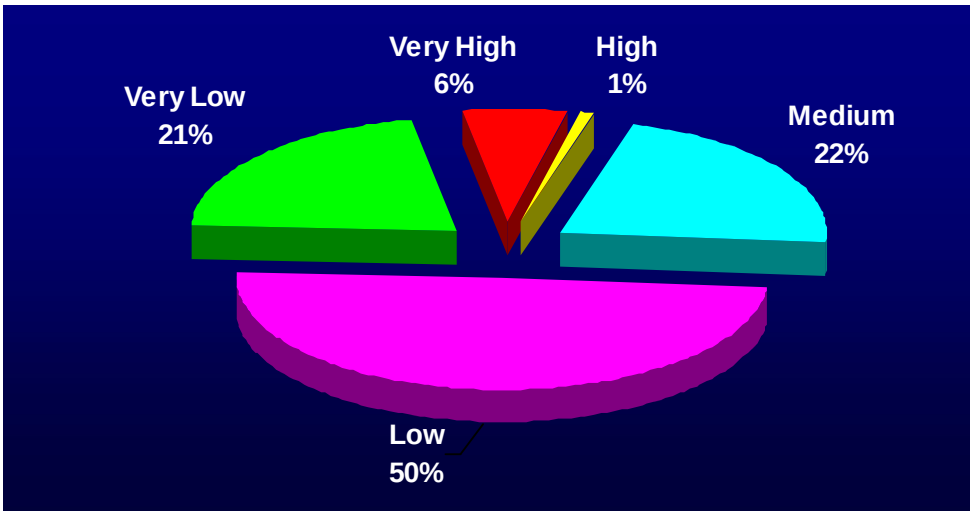
10 (4%) of the respondents replied Very High, 18 (7%) said High, 60 (24%) said Medium, 102 (40%) said Low and 64 (25%) said Very Low. The results show that in the view of the survey respondents the present level of product design was very low in assisting the country in competing with other companies at domestic and international level. The result is also shown in graph 16 below.



Graph 16: Assistance of present product designs of Nigerian consumer products to compete at the domestic and international level

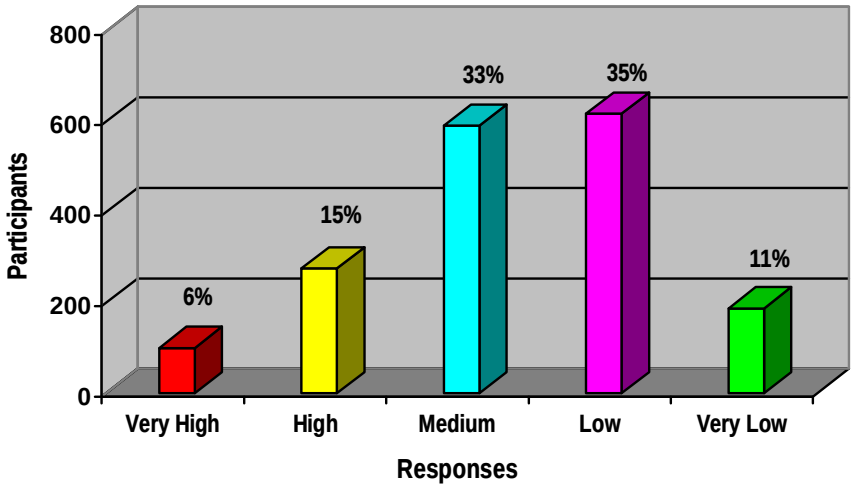
Question 7: ***Does the present product design of consumer goods in Nigeria successfully meet the expectations and demands of Nigerian consumers?***

16 (6%) of the respondents said Very High, 2 (1%) said High, 56 (22%) said Medium, 126 (50%) said Low and 54 (21%) said Very Low. It is revealed from these results that the present product designs of the products manufactured in the Nigerian manufacturing sector were of a very low level to meet the demands and expectations of the consumers. The result is also shown in graph 17 below.



Graph 17: Present product design of consumer goods meeting the expectations and demands of Nigerian consumers

Section Two - Combined Result: All the seven questions of this section were calculated separately as well as collectively for getting the overall opinion of the respondents about product designing in the Nigerian manufacturing sector and according to the combined calculation 100 (6%) of the respondents rated the product design of Nigerian manufacturing as very high. According to the opinion of 276 (15%) respondents the level of product design was high, 592 (33%) regarded it medium, 618 (35%) low and 188 (11%) very low. The result is also shown in graph 18 below.



Graph 18: Overall opinion of the respondents about product designing in the Nigerian manufacturing sector

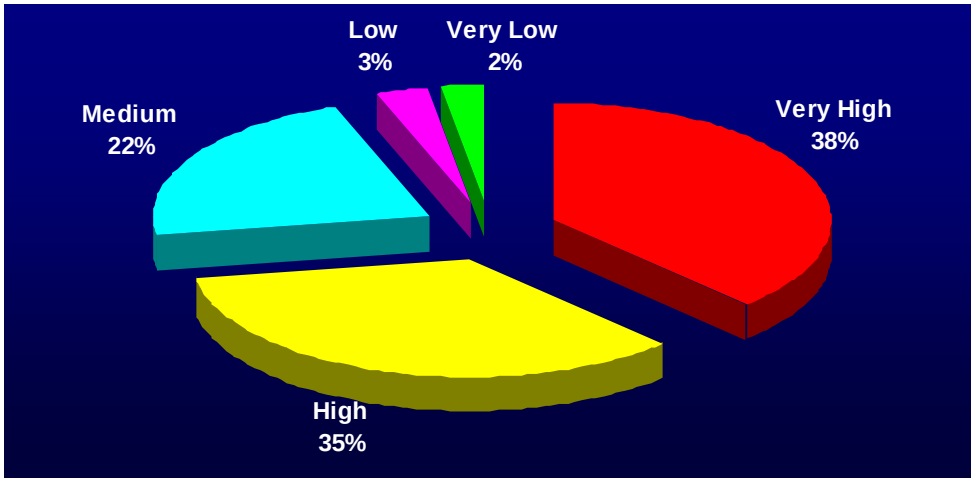
The collective results of the section showed that from the questions asked from different aspects that the present level of product designs in consumer goods manufacturing was not satisfying for the professionals working in the same field. Repondents believed that the product design of the Nigerian manufacturing organizations was at a very low level due to which it cannot assist the country to be competitive at both domestic and international levels. Moreover the lack of research and development work among the manufacturing companies of Nigeria was also identified in the results of this section of the questionnaire as a major impediment to growth.

5.2.3 Section III – Information about the manufacturing process in the Nigerian manufacturing sector

There were in total seven questions in the third section of the questionnaire. The respondents were asked in this section to express their views about the manufacturing process employed in the Nigerian manufacturing Organizations. These seven questions came up with the following results.

Question 8: ***To what level do you think that Nigerian government policies including structural adjustment programmes (SAP) induced high cost of imported machinery and raw materials in terms of growth and productivity in Nigerian manufacturing firms?***

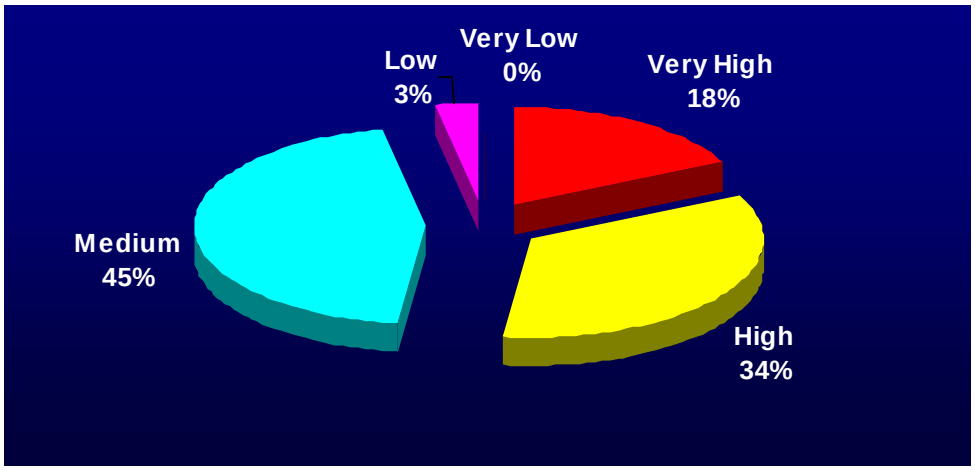
96 (38%) of the respondents said Very High, 88 (35%) said High, 56 (22%) said Medium, 8 (3%) said Low and 6 (2%) said Very Low. The results of the question indicated that the respondents of the survey shared the common view that the SAP induced reforms have proved not to be supportive for the growth and development of the manufacturing sector in Nigeria. The result is also shown in graph 19.



Graph 19: Impact of SAP on the growth and high productivity of the Nigerian manufacturing sector

Question 9: ***To what extent do you see the need for training and skill development programmes for workers of Nigerian manufacturing companies to enable them adopt high level manufacturing process?***

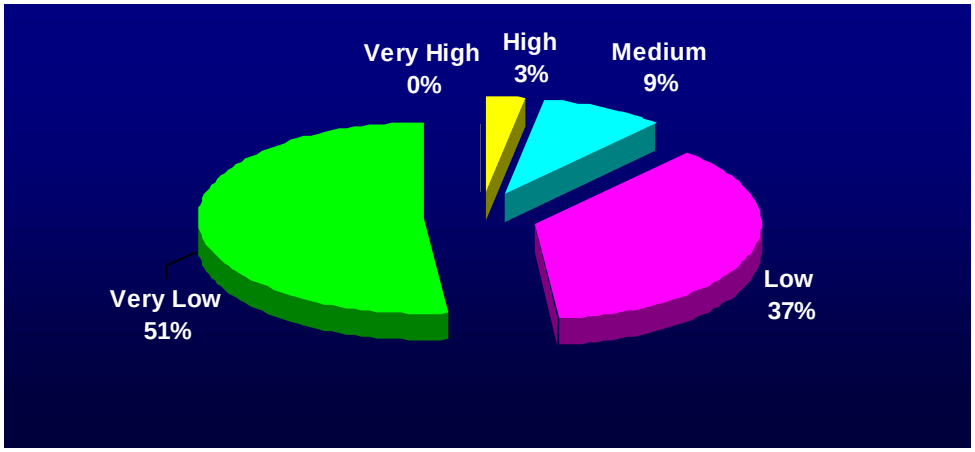
46 (18%) of the respondents replied Very High, 88 (34%) said High, 116 (45%) said Medium, 8 (3%) said Low and 0 (0%) said Very Low. The results showed that professionals working in the manufacturing sector felt that there was a medium level need for training and skill development of the workers engaged in the manufacturing of the products. The result is also shown in graph 20.



Graph 20: Need of training and skill developments for the workers of the Nigerian manufacturing companies

Question 10: ***To what level are Nigerian Manufacturing companies adopting new machinery and methodology within their manufacturing processes?***

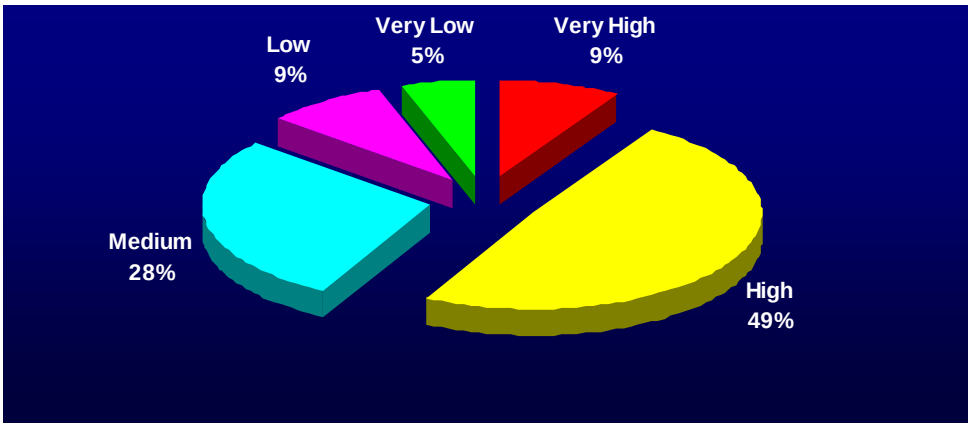
0 (0%) of the respondents said Very High, 6 (3%) said High, 20 (9%) said Medium, 82 (37%) said Low and 116 (51%) said Very Low. According to the respondents, Nigerian firms were preceding at a very low level in adopting the new technology and machinery in their manufacturing process. The result is also shown in graph 21.



Graph 21: Level of adoption to new machinery and methodology by the Nigerian manufacturing companies

Question 11: ***To what level is the Nigerian Manufacturing sector well-equipped with the skills needed to adopt international modern manufacturing processes?***

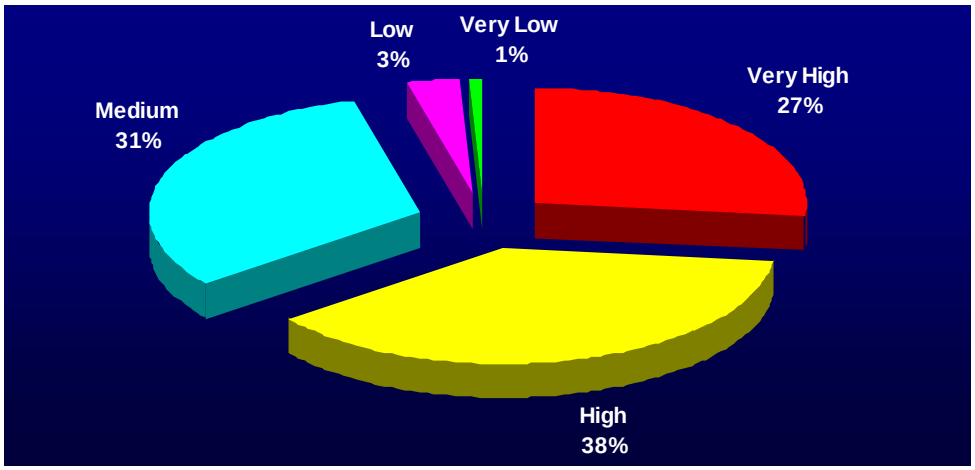
20 (9%) of the respondents said Very High, 114 (49%) said High, 66 (28%) said Medium, 20 (9%) said Low and 12 (5%) said Very Low. It shows that the professionals working in the Nigerian manufacturing sector saw the skills of the sector at a high level and capable of conducting international standard manufacturing. The result is also shown in graph 22.



Graph 22: Skills of Nigerian manufacturing sector to conduct international level manufacturing processes

Question 12: ***To what extent is the need to restructure the manufacturing process of Nigerian firms towards focusing on remanufacturing?***

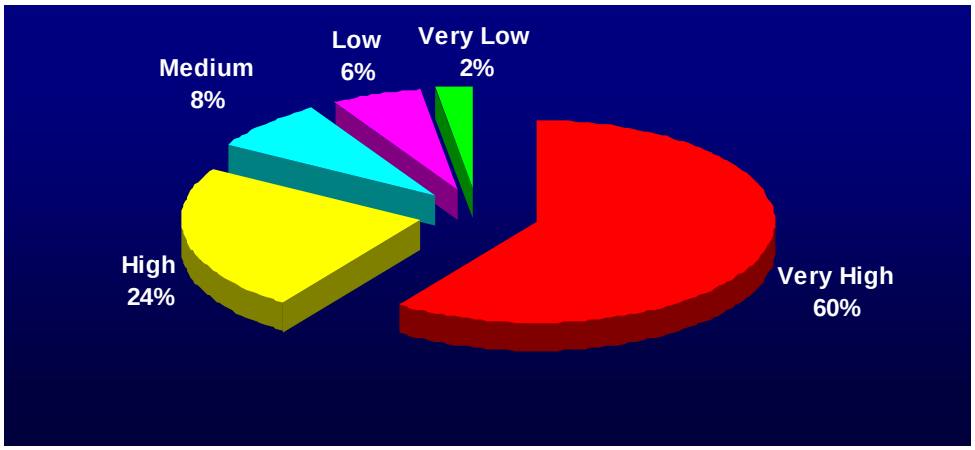
In reply, 68 (27%) of the respondents said Very High, 96 (38%) said High, 80 (31%) said Medium, 8 (3%) said Low and 2 (1%) said Very Low. The results indicated that most participants felt the need to restructure the manufacturing process of Nigerian companies at a high level. The result is also shown in graph 23.



Graph 23: Need for restructuring the manufacturing process of Nigerian firms

Question 13: ***To what level is the technical know-how and machinery availability affecting the performance of the Nigerian manufacturing companies?***

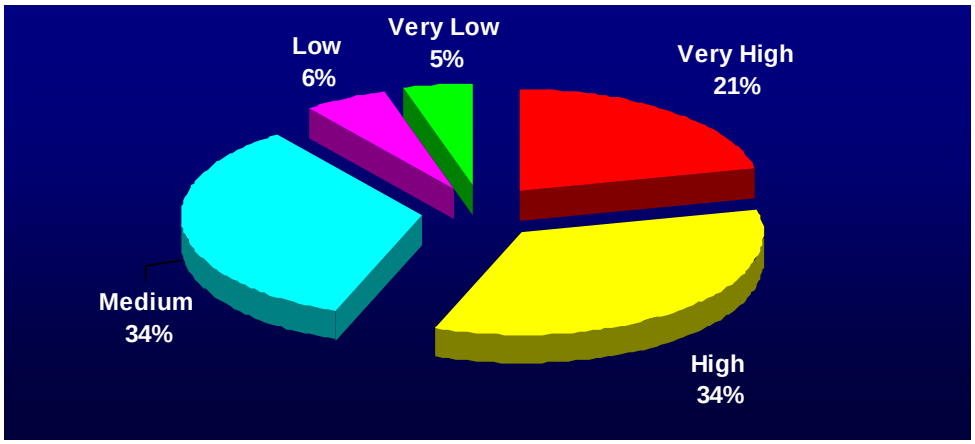
152 (60%) of the respondents replied Very High, 60 (24%) said High, 20 (8%) said Medium, 16 (6%) said Low and 6 (2%) said Very Low. It was found that that technical knowledge affects the performance of the manufacturing process up to a very high level in Nigeria. The result is also shown in graph 24.



Graph 24: Effect of technical know-how and machinery availability
on the performance of Nigerian manufacturing sector

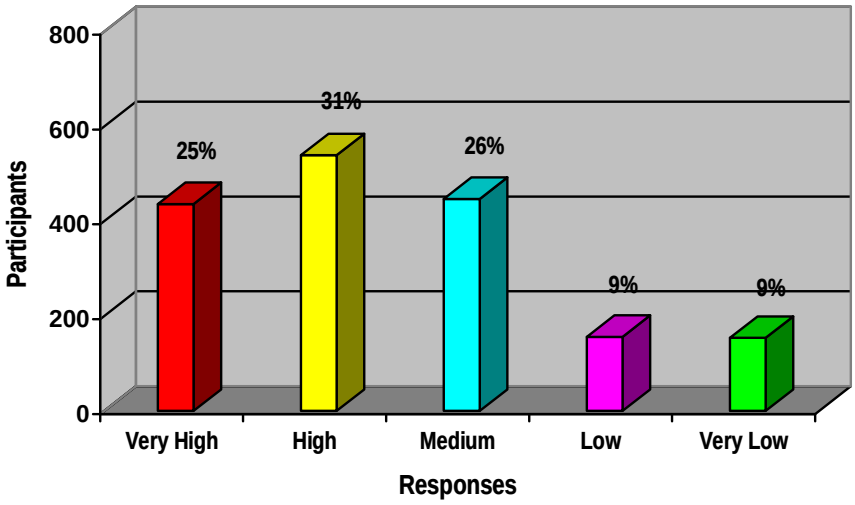
Question 14: ***To what level do you think the Nigerian manufacturing firms should focus on the issues of chain, lean and agile manufacturing concepts?***

54 (21%) of the respondents said Very High, 87 (34%) said High, 87 (34%) said Medium, 14 (6%) said Low and 12 (5%) said Very Low. The results showed that the above mentioned issues were considered very important by the participants in the survey. The result is also shown in graph 25.



Graph 25: Focus needed by the Nigerian manufacturing firms on chain, lean and agile manufacturing

Section Five - Combined result: All seven questions of this section were calculated separately as well as combined to get the overall opinion of the respondents about the manufacturing process followed in the Nigerian manufacturing sector. According to the combined calculation 466 (27%) of the respondents rated the manufacturing process followed by the companies operating in the Nigerian manufacturing sector as very high. According to the opinion of 402 (23%) respondents the manufacturing process level was high, 208 (12%) regarded it as medium, 376 (22%) low and 272 (16%) very low. The result is also shown in Graph 26.



Graph 26: Overall opinion of respondents about manufacturing processes in the Nigerian manufacturing sector

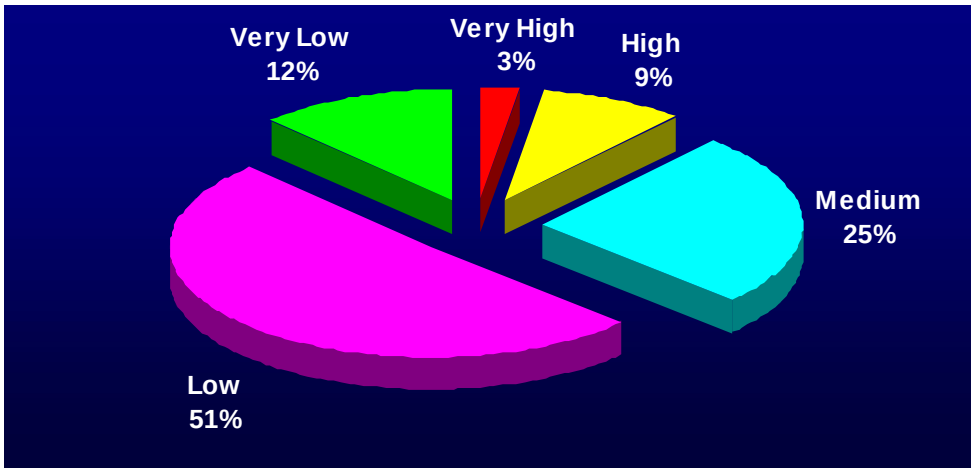
The combined results showed that the participants of the survey had a strong belief that the SAP reforms had affected the growth of the Nigerian manufacturing sector and there was a need for restructuring the manufacturing process as well as to concentrate on certain important issues like chain, lean and agile manufacturing to get in a strong position. In this section the participants also expressed their view that skills and technical equipment affected the performance of the manufacturing in Nigeria at a high level, however the sector possesses the capabilities to adopt the new technology and work at an international standard.

5.2.4 Section IV – Information about manufacturing strategy in the Nigerian manufacturing sector

The fourth section of the questionnaire consisted of seven questions related to the manufacturing strategy adopted by the companies operating in the Nigerian manufacturing sector. Following are the results obtained from section IV of the questionnaire.

Question 15: ***To what extent is the Nigerian manufacturing companies implementing modern manufacturing strategies for the manufacture of different consumer products?***

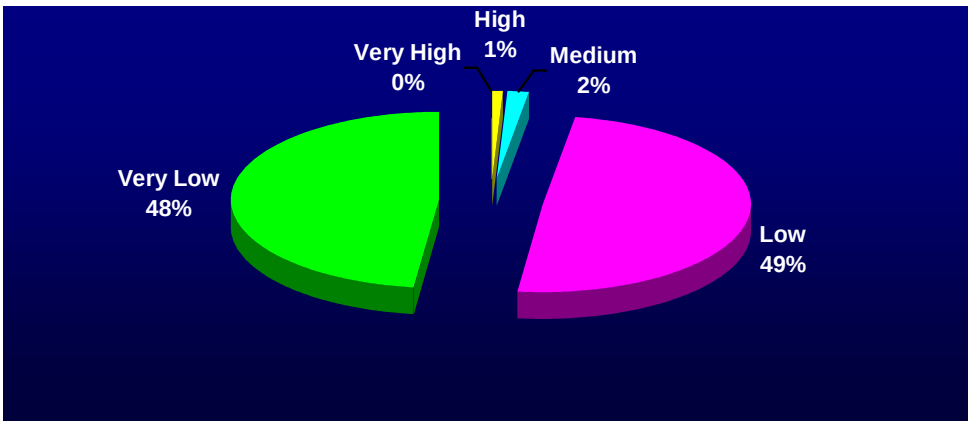
In reply, 6 (3%) of the respondents said Very High, 20 (9%) said High, 58 (25%) said Medium, 116 (51%) said Low and 28 (12%) said Very Low. It was revealed from the results of this question that most of the professionals operating in the Nigerian manufacturing sector believed that the manufacturing strategy of the Nigerian manufacturing companies is at a medium level. The result is also shown in graph 27.



Graph 27: Extent to which the Nigerian manufacturing companies implementing modern manufacturing strategies for the manufacture of different consumer products

Question 16: ***To what extent are the manufacturing strategies adopted by the Nigerian manufacturing companies meeting international standards?***

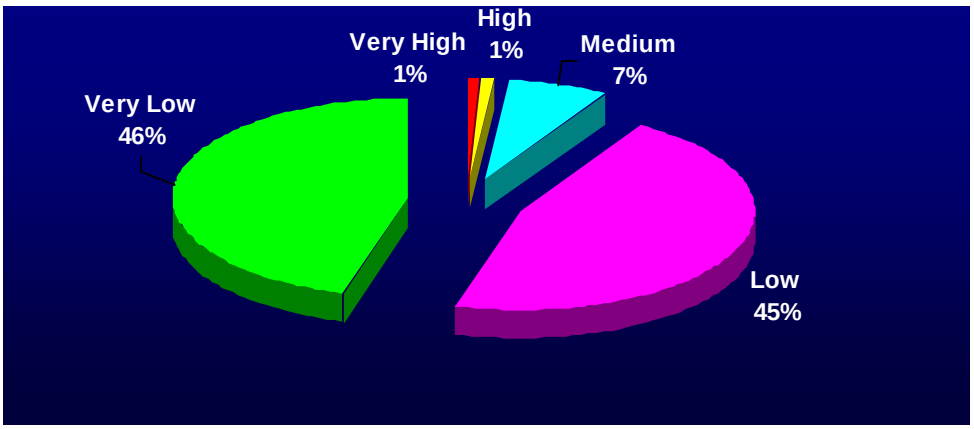
0 (0%) of the respondents replied Very High, 2 (1%) said High, 4 (2%) said Medium, 126 (49%) said Low and 122 (48%) said Very Low. Thus it was found that the respondents of the survey strongly believed that the manufacturing process adopted by the manufacturing companies of Nigeria was very low by international standards. The result is also shown in graph 28.



Graph 28: Extent to which the manufacturing strategies adopted by the Nigerian manufacturing companies meeting international standards

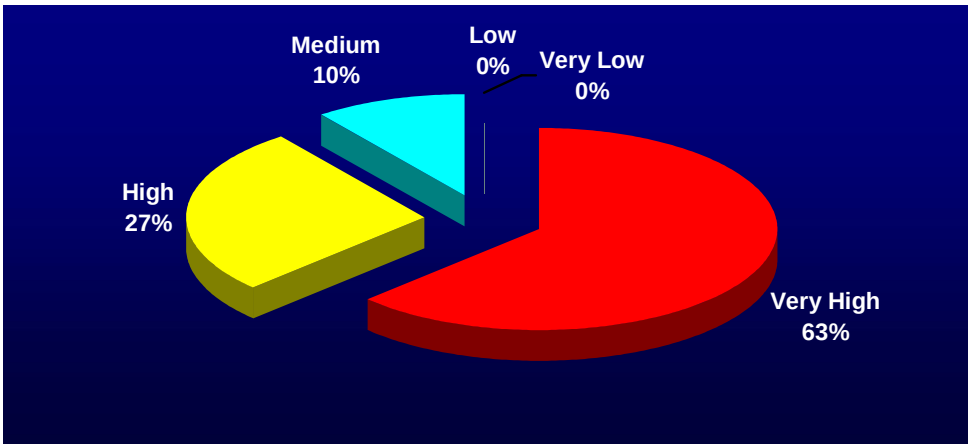
Question 17: ***How do you evaluate the ability of the Nigerian manufacturing firms to successfully capture the attention and loyalty of the consumers through adoption of effective manufacturing strategy?***

In reply, 2 (1%) of the respondents said Very High, 2 (1%) said High, 18 (7%) said Medium, 116 (45%) said Low and 116 (46%) said Very Low. The results made it clear that the professionals who participated in the survey believed that the manufacturing companies of Nigeria were progressing at a very low level in the context of capturing the attention of the consumers and retaining their loyalty. The result is also shown in graph 29.



Graph 29: Ability of the Nigerian manufacturing firms to successfully capture the attention and loyalty of the consumers through adoption of effective manufacturing strategy

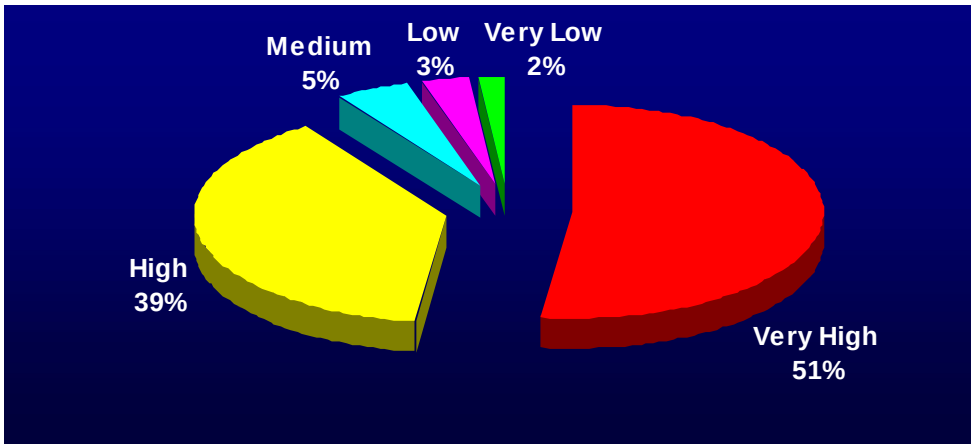
Question 18: ***How much is the weak infrastructure of the operating environment of the country hindering the development and implementation of effective manufacturing strategy in Nigeria?*** In reply to this question, 158 (63%) of the respondents said Very High, 68 (27%) said High, 26 (10%) said Medium, 0 (0%) said Low and 0 (0%) said Very Low. Thus it was clarified from the results of this section that the manufacturing sector was highly affected by the weak infrastructure of the country according to the opinions of the respondents of the survey. The result is also shown in graph 30.



Graph 30: Weak infrastructure of the operating environment of the country hindering the development and implementation of effective manufacturing strategy in Nigeria

Question 19: ***To what extent do you perceive major flaws in the manufacturing strategy of the Nigerian manufacturing companies?***

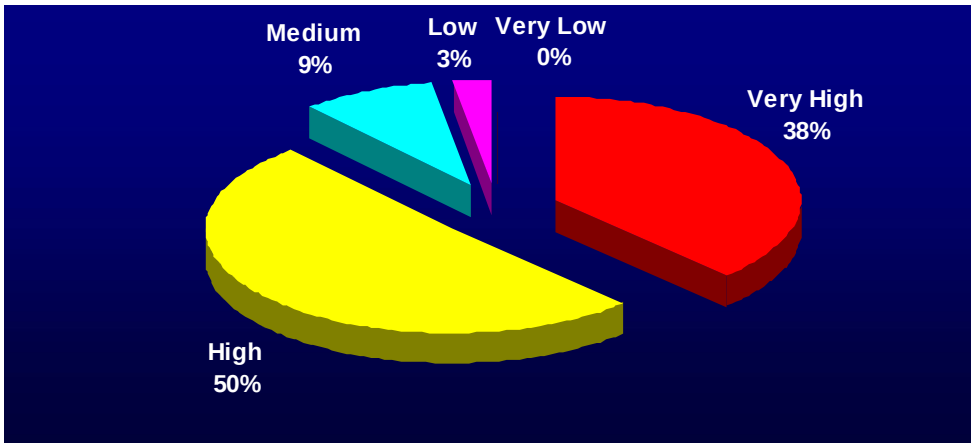
132 (51%) of the respondents said Very High, 98 (39%) said High, 12 (5%) said Medium, 8 (3%) said Low and 4 (2%) said Very Low. It was found that there was a very high level of flaws observed in the manufacturing strategy of the Nigerian manufacturing firms by the professionals who participated in the survey. The result is also shown in graph 31.



Graph 31: Perception about major flaws in the manufacturing strategy of the Nigerian manufacturing companies

Question 20: ***To what extent do you see the need in the Nigerian firms following the patterns of other developing countries' firms to develop effective and productive manufacturing strategy?***

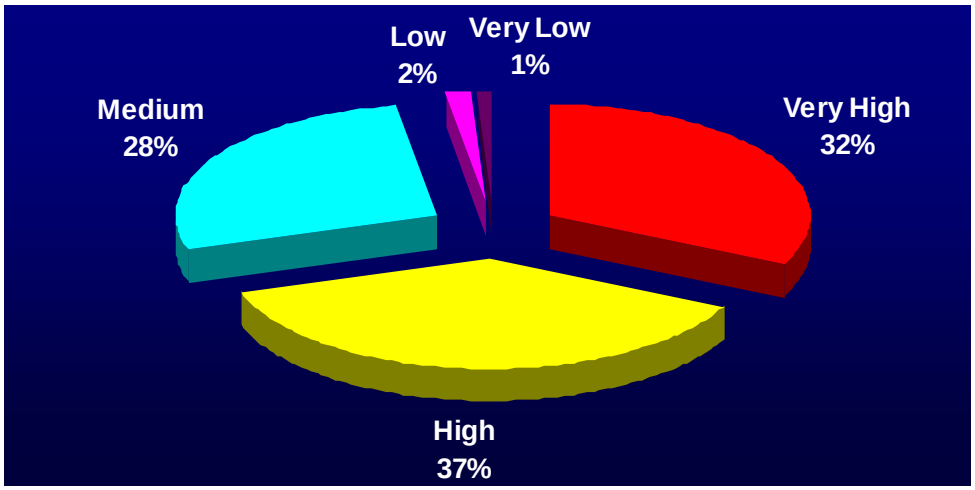
In reply, 86 (38%) of the respondents replied Very High, 116 (50%) said High, 20 (9%) said Medium, 6 (3%) said Low and 0 (0%) said Very Low. The answers of this question show that the respondents of the survey strongly felt the need for Nigerian firms to follow the patterns of the other developing countries' manufacturing processes. The result is also shown in graph 32.



Graph 32: Need in the Nigerian firms in the following the patterns of other developing countries' firms to develop effective and productive manufacturing strategy

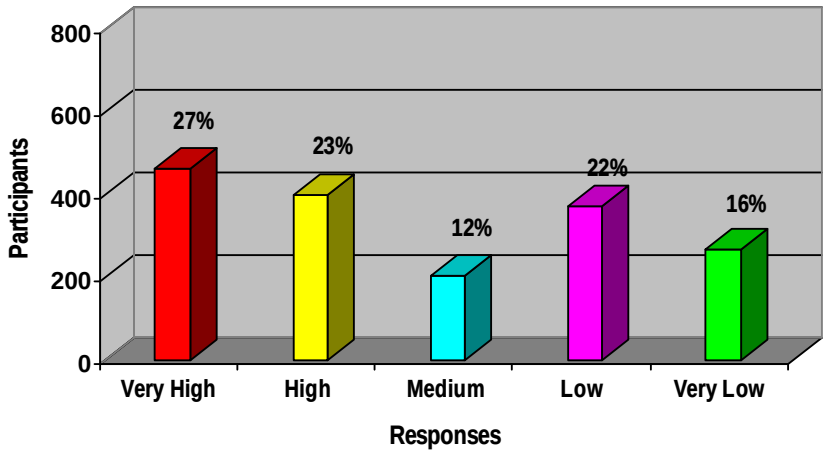
Question 21: ***To what extent do you see the need for any major changes in the manufacturing strategies adopted by the Nigerian Manufacturing companies?***

In reply, 82 (32%) of the respondents said Very High, 96 (37%) said High, 70 (28%) said Medium, 4 (2%) said Low and 2 (1%) said Very Low. It was discovered that the professionals working in the Nigerian manufacturing sector strongly felt the need for major reforms in the manufacturing sector strategies need to be adopted by the companies. The result is also shown in graph 33.



Graph 33: Need for any major changes in the manufacturing strategies adopted by the Nigerian manufacturing companies

Section Four - Combined Result: All seven questions of this section were calculated separately as well as combined to get an overall opinion of the respondents about the manufacturing strategy adopted in the Nigerian manufacturing sector. According to the combined calculation, 466 (27%) of the respondents rated the manufacturing strategy adopted by the companies operating in the Nigerian manufacturing sector Very High. According to the opinion of 402(23%) respondents the manufacturing strategy level was high, 208 (12%) regarded it as medium, 376 (22%) low and 272 (16%) very low. The result is also shown in Graph 34.



Graph 34: Overall opinion of respondents about manufacturing strategy in the Nigerian manufacturing sector

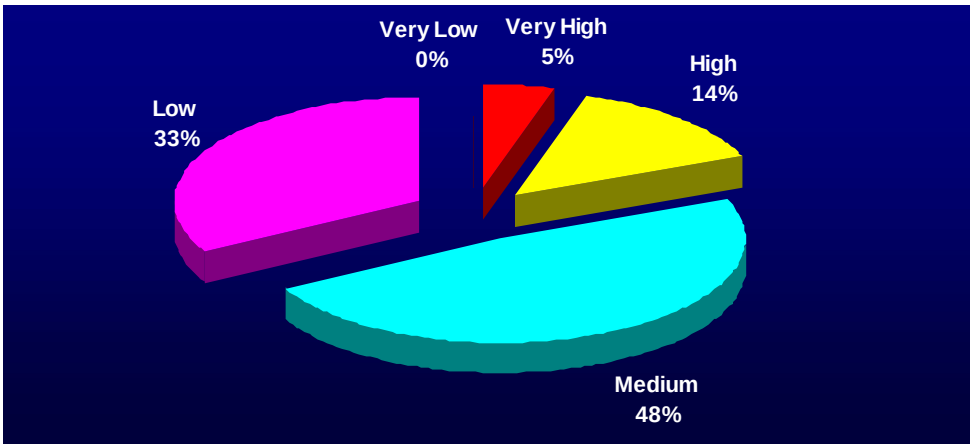
It is shown from the collective results of the survey that the participants for the most part felt the need for reforms in the manufacturing strategy of Nigerian companies and at the same time they also think that Nigerian firms should learn from other developing countries so that they can also proceed along the development path. It was also found from the survey results that the respondents were split about the present manufacturing strategy of Nigerian firms although they realized that it cannot help the country at an international level because through this strategy the manufacturing firms were not able to capture the attention of the consumers or successfully retain the loyalty of their existing consumers.

5.2.5 Section V – Information about innovation in the Nigerian manufacturing sector

The third section of the questionnaire consisted of seven questions and these questions were related to innovation in the manufacturing of consumer goods in the Nigerian manufacturing sector. Following are the results obtained from section V of the questionnaire.

Question 22: ***How do you see the present level of technology usage in product designing in the Nigerian manufacturing sector?***

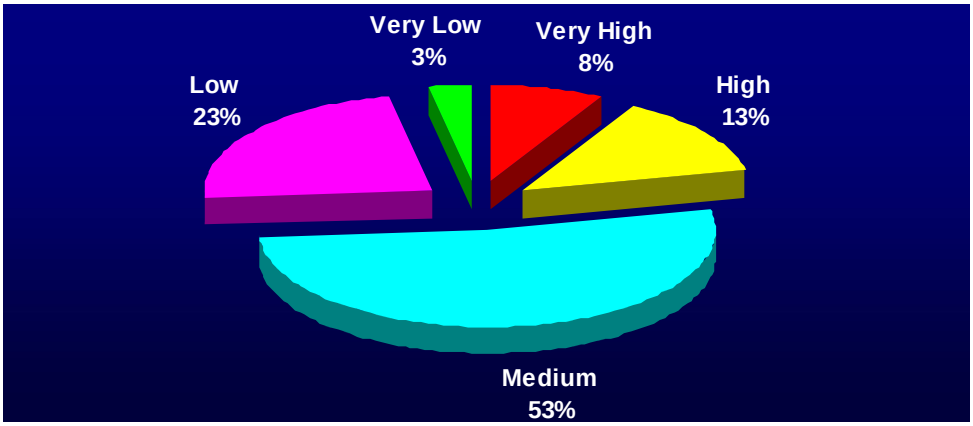
In reply to this question, 12 (5%) of the respondents said Very High, 36 (14%) said High, 122 (48%) said Medium, 84 (33%) said Low and 0 (0%) said Very Low. It was found from the results that the respondents of the survey believe that the technology usage level in the Nigerian manufacturing sector had reached a level that could be regarded as medium for the product design of consumer goods. The result is also shown in graph 35.



Graph 35: present level of technology usage in product designing in the Nigerian manufacturing sector

Question 23: ***To what extent do the manufacturing companies of Nigeria offer different consumer products with innovative features and benefits?***

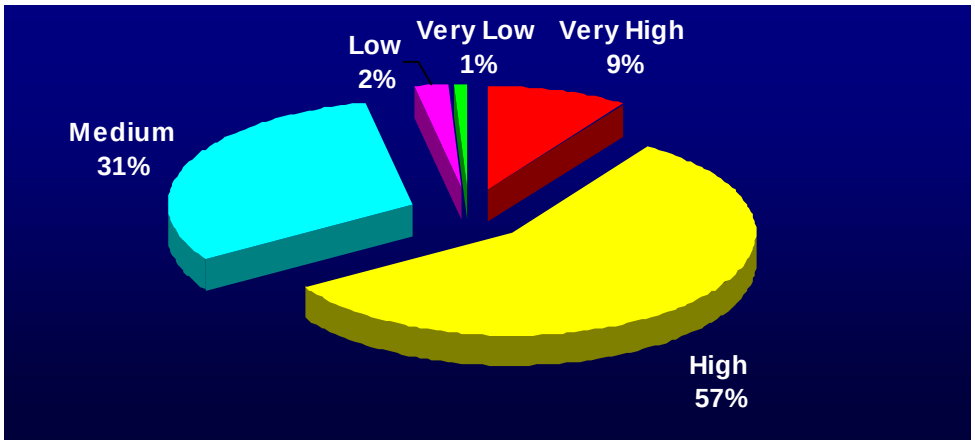
20 (8%) of the respondents replied Very High; 34 (13%) said High, 132 (53%) said Medium, 58 (23%) said Low and 8 (3%) said Very Low. The answers also made it clear that most of the respondents of the survey saw innovation in product design of Nigerian manufactured consumer goods at a medium level. The result is also shown in graph 36.



Graph 36: Extent to which manufacturing companies of Nigeria offer different consumer products with innovative features and benefits

Question 24: ***How do you see the differences in features and benefits of the present Nigerian consumer products as compared within the past 5 -10 years?***

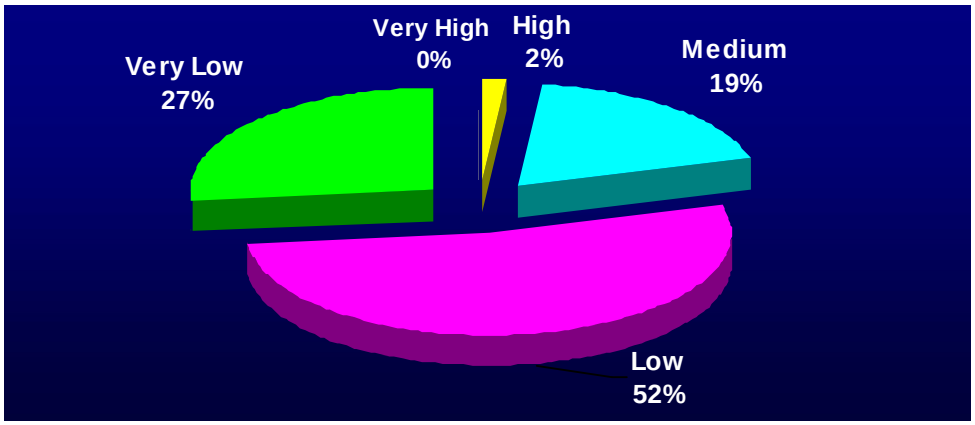
In reply to this question, 24 (9%) of the respondents said Very High, 144 (57%) said High, 78(31%) said Medium, 6 (2%) said Low and 2 (1%) said Very Low. It is found from the results of this question that the difference between the present designs of the products in the Nigerian manufacturing sector was very high as compared with the past. The result is also shown in graph 37.



Graph 37: Differences in features and benefits of the present Nigerian consumer products as compared within the past 5 -10 years

Question 25: ***How do you evaluate the present level of technological innovations by the Nigerian companies in products designing and manufacturing?***

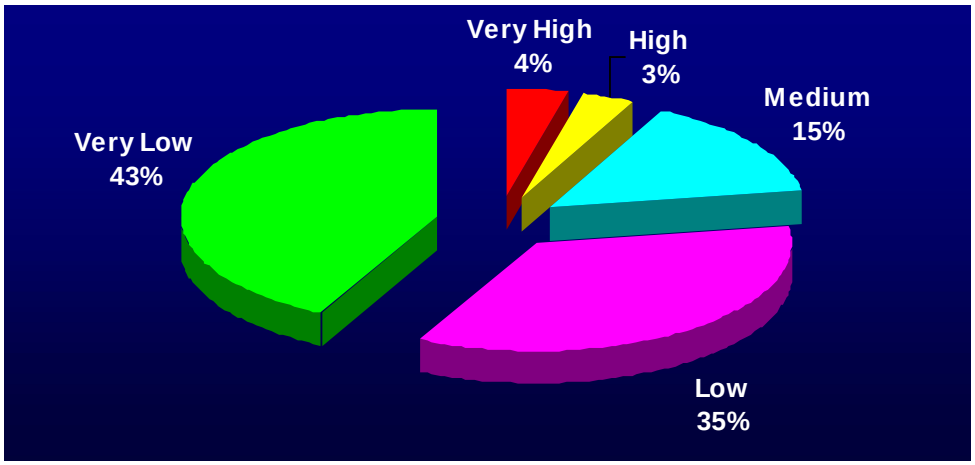
0 (0%) of the respondents said Very High, 4 (2%) said High, 48 (19%) said Medium, 134 (52%) said Low and 68 (27%) said Very Low. It was found that most of the respondents of the survey believed that present technology usage in product design was at a low level. The result is also shown in graph 38.



Graph 38: Present level of technological innovations by the Nigerian companies in products designing and manufacturing

Question 26: ***What is the level of Nigerian Manufacturing Sector's capabilities in offering innovative consumer products in the context of globalization and high competition?***

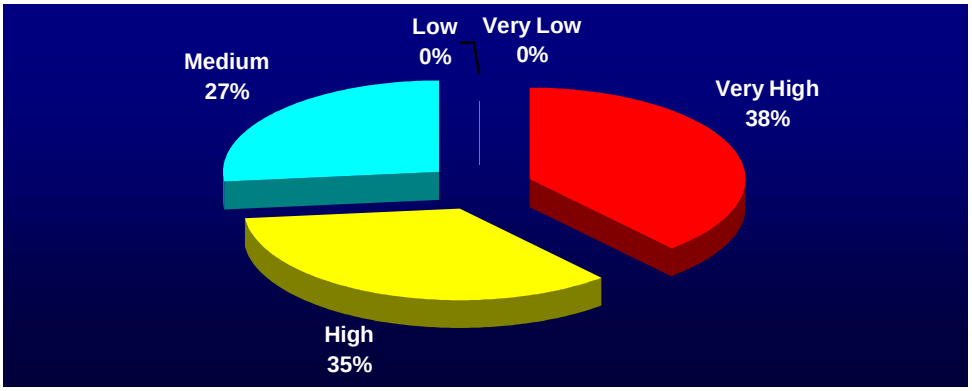
In reply to this question, 10 (4%) of the respondents said Very High, 8 (3%) said High, 38 (15%) said Medium88 (35%) said Low and 106 (43%) said Very Low. It was found there was a low standard amongst Nigerian manufacturing companies in offering innovative consumer products in a highly competitive environment. The result is also shown in graph 39.



Graph 39: level of Nigerian Manufacturing Sector's capabilities in offering innovative consumer Products in the context of globalization and high competition

Question 27: ***What is the level of awareness among the Nigerian manufacturing companies regarding adopting innovative designs and manufacturing techniques?***

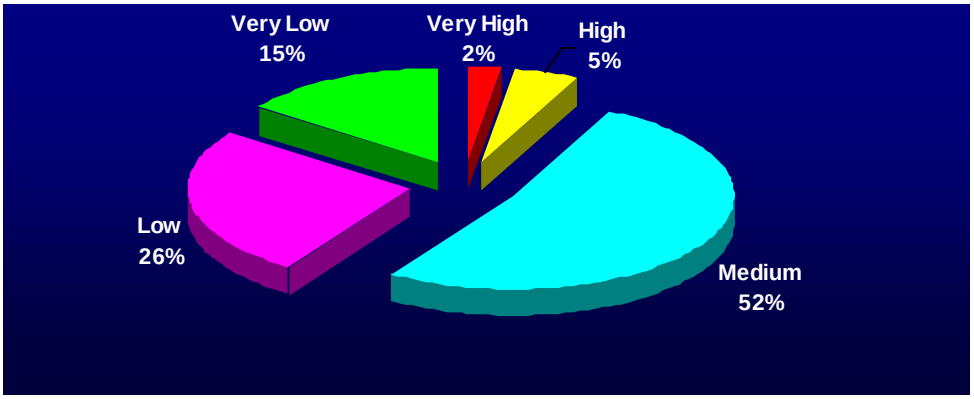
In reply, 98 (38%) of the respondents replied Very High, 88 (35%) said High, 68 (27%) said Medium, 0 (0%) said Low and 0 (0%) said Very Low. It was found that the level of awareness is very high among the manufacturing companies of Nigeria regarding the adoptability of innovative design and techniques for product manufacturing. The result is also shown in graph 40



Graph 40: of awareness among the Nigerian manufacturing companies regarding adopting innovative designs and manufacturing techniques

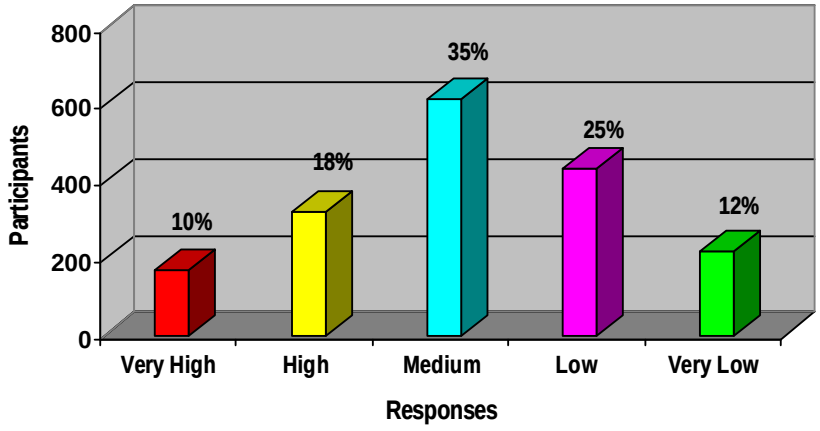
Question 28: ***To what extent do Nigerian manufacturing firms give importance to innovations in the process of product designing and manufacturing?***

In reply, 6 (2%) of the respondents said Very High, 12 (5%) said High, 132 (52%) said Medium, 66 (26%) said Low and 38 (15%) said Very Low. It was found that many of the survey respondents saw that the manufacturing companies of Nigeria give a medium level importance to innovation in product design. The result is also shown in graph 41.



Graph 41: Extent to which Nigerian manufacturing firms give importance to innovations in the process of product designing and manufacturing

Section Five - Combined Result: All seven questions of this section were calculated separately as well as combined to get the overall opinion of the respondents about innovation in the Nigerian manufacturing sector and according to the combined calculation. 170 (10%) of the respondents rated innovation within the Nigerian manufacturing sector very high. The result is also shown in Graph 42.



Graph 42: Overall opinion of the respondents about innovation in the Nigerian manufacturing sector

According to the opinion of 326 (18%) respondents the level of innovation was high, 618 (35%) regarded it medium, 436 (25%) low and 222 (12%) very low. Thus it wass revealed from the collective results of this section that the respondents of the survey rated innovation within the Nigerian manufacturing sector at a medium level.

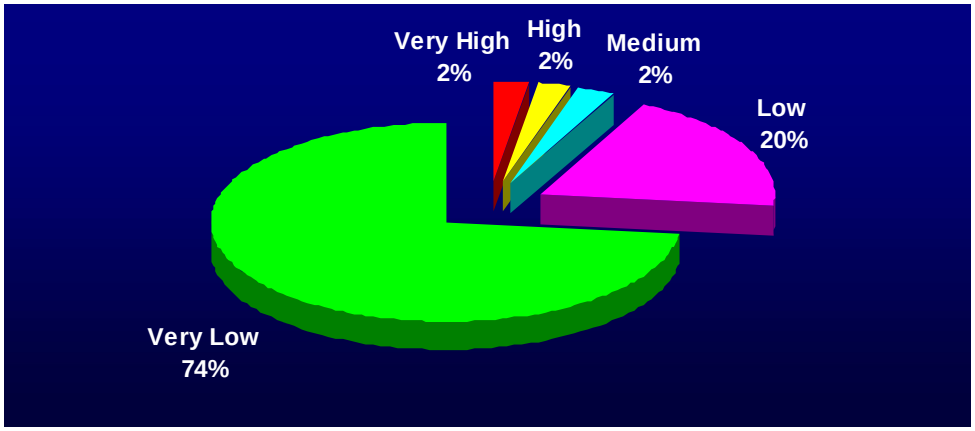
5.2.6 Section VI – Information about environmental uncertainty in the Nigerian manufacturing sector

The sixth section of the questionnaire consisted of seven questions related to environmental uncertainty in the Nigerian business environment and its effect on the operations and activities of the Nigerian manufacturing sector. Following are the results obtained from section VI of the questionnaire.

Question 29: ***To what level is the current business environment and market structure of Nigeria satisfying and supporting the manufacturing activities?***

6 (2%) of the respondents replied Very High, 6 (2%) said High, 6 (2%) said Medium, 50 (20%) said Low and 184 (74%) said Very Low. It was indicated from the results that in the view of

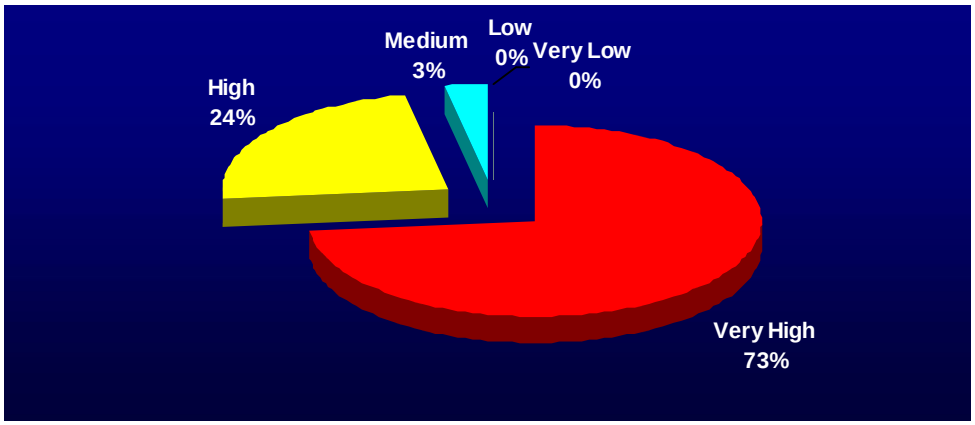
the respondents of the survey, at present the business environment of the country was very low in supporting manufacturing activities. The result is also shown in graph 43.



Graph 43: current business environment and market structure of Nigeria in satisfying and supporting the manufacturing activities

Question 30: ***To what extent has the level of Nigerian environmental uncertainty reached where the manufacturing activities are adversely affected?***

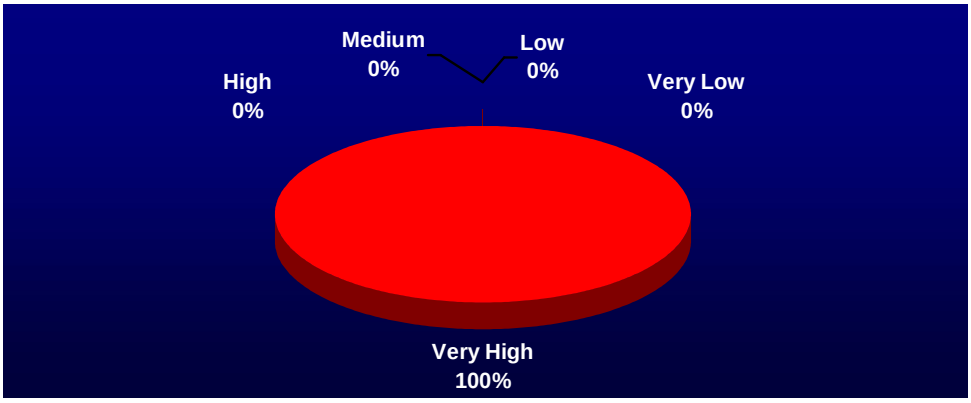
186 (73%) of the respondents said Very high, 60 (24%) said High, 8 (3%) said Medium, 0 (0%) said Low and 0 (0%) said Very Low. The results of this question also indicate that the participants of the survey thought that environmental uncertainty in Nigeria had reached a very high level where it could strongly affect manufacturing sector activities, operations and development. The result is also shown in graph 44.



Graph 44: Extent to which Nigerian environmental uncertainty adversely affecting the manufacturing activities

Question 31: ***To what level has the non availability or difficulties in getting finance and credits hindered the growth and high quality performance of Nigerian Manufacturing firms?***

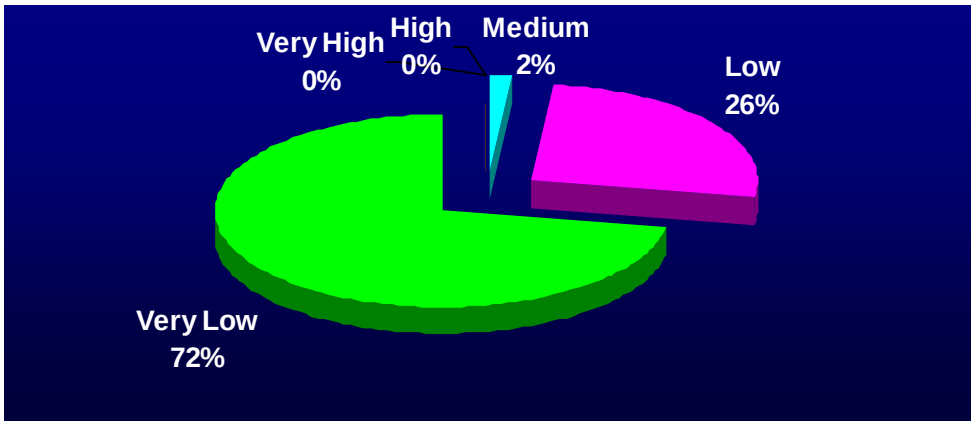
In reply, 254 (100%) of the respondents said Very High. The results of this question came up with a very clear answer that all of the participants of the survey shared a common belief and had no differences on the matter that the unavailability of financial resources was an important barrier to the growth of the manufacturing sector in Nigeria. The result is also shown in graph 45.



Graph 45: Non availability or difficulties in getting finance and credits hindering the growth and high quality performance of Nigerian Manufacturing firms

Question 32: ***To what extent is socio-political environment of Nigeria supportive of manufacturing activities?***

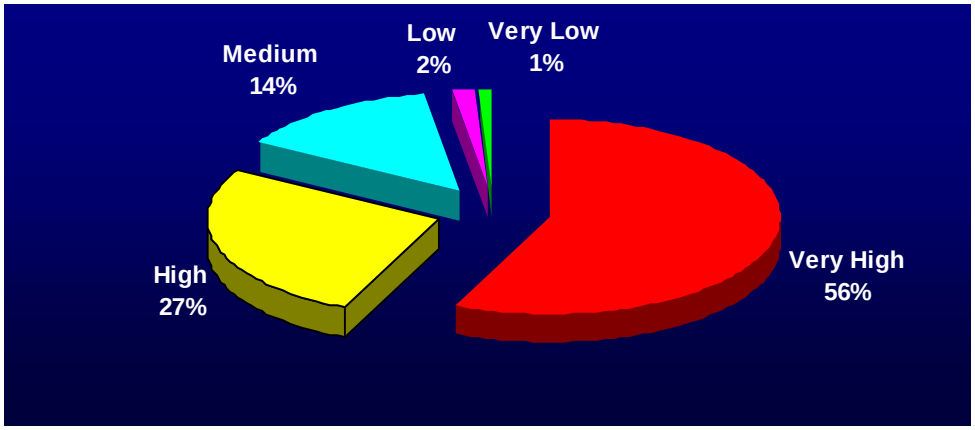
0 (0%) of the respondents said Very High, 0 (0%) said High, 4 (2%) said Medium, 66 (26%) said Low and 182 (72%) said Very Low. The answers made it clear that the respondents of the survey strongly believed that the manufacturing sector was very little supported by the socio-political environment of the country. The result is also shown in graph 46.



Graph 46: Extent to which socio-political environment of Nigeria supportive of manufacturing activities

Question 33: ***To what extent do you think some degree of improvements could be achieved through government support for a stable and suitable environment for the manufacturing activities?***

In reply, 144 (56%) of the respondents replied Very High, 68 (27%) said High, 36 (14%) said Medium, 4 (2%) said Low and 2 (1%) said Very Low. These results show that most of the participants believed that the government can play a role in the situation as government steps could make high level changes in the entire situation. The result is shown in graph 47.

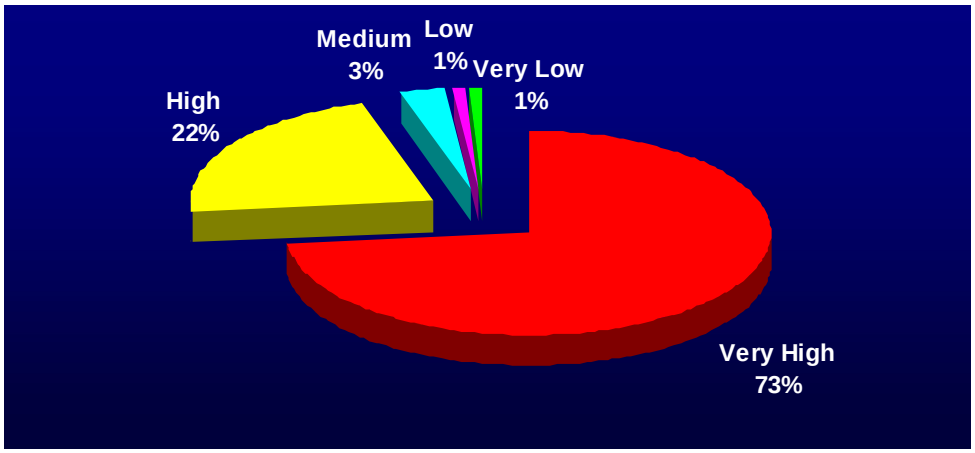


Graph 47: Extent to which some degree of improvements could be achieved through government support for a stable and suitable environment for the manufacturing activities

Question 34: ***What level of influence do the foreign products have over the operations of the Nigerian manufacturing firms?***

186 (73%) of the respondents said Very High, 56 (22%) said High, 8 (3%) said Medium, 2 (1%) said Low and 2 (1%) said Very Low. The results show that most of the participants believed

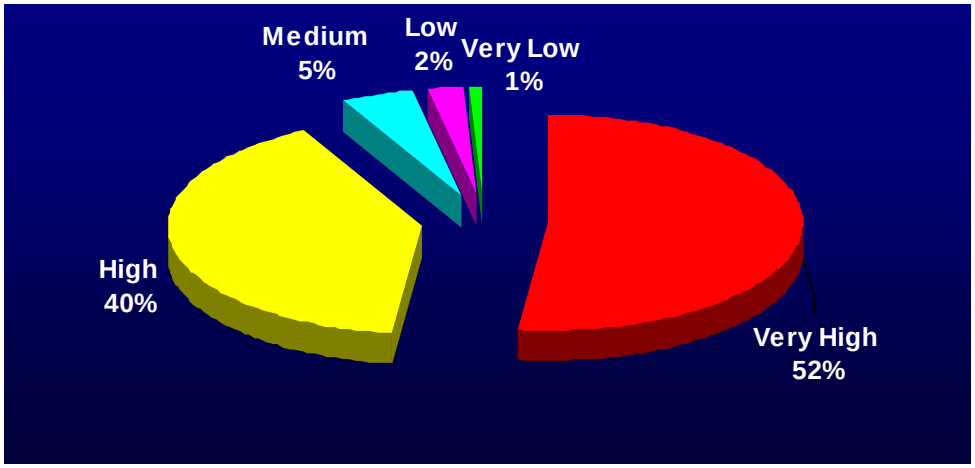
that foreign products highly influenced the operations of manufacturing firms in Nigeria. The result is also shown in graph 48.



Graph 48: Influence of foreign products over the operations of the Nigerian manufacturing firms

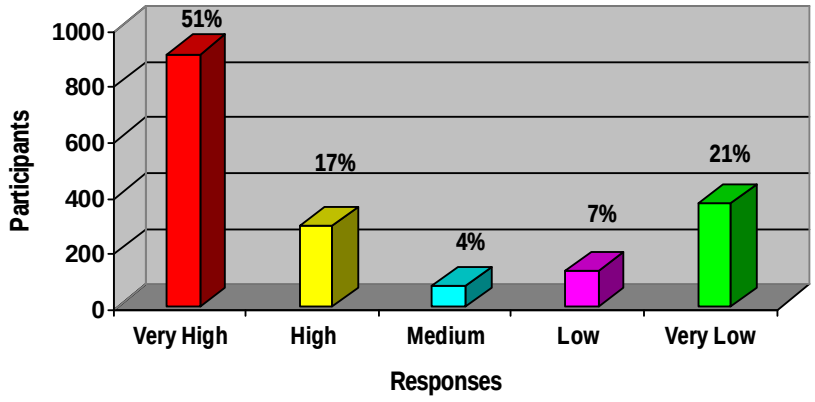
Question 35: ***To what extent are Nigerian manufacturing firms open towards adopting rapid environmental and technological advancements?***

In reply, 132 (52%) of the respondents said Very High, 102 (40%) said High, 12 (5%) said Medium, 6 (2%) said Low and 2 (1%) said Very Low. The results indicate that many of the participants of the survey saw a very high level of openness in the Nigerian manufacturing sector with regard to the adaptation of new technology. The result is also shown in graph 49.



Graph 49: Extent to which Nigerian manufacturing firms are open towards adopting rapid environmental and technological advancements

Section Six - Combined Result: All the seven questions of this section were calculated separately as well as combined to get the overall opinion of the respondents about environmental uncertainty and its effects on the Nigerian manufacturing sector. According to the combined calculation 908 (51%) of the respondents said environmental uncertainty prevailing in the business environment of Nigeria effected the companies operating in the Nigerian manufacturing sector Very High. According to the opinion of 292 (17%) respondents the environmental uncertainty affecting level was high, 74 (4%) regarded it as medium, 128 (7%) low and 372 (21%) very low. The result is also shown in Graph 50.



Graph 50: Opinion of respondents on environmental uncertainty affecting Nigerian manufacturing sector

Thus it is revealed from the combined results of this section that in the opinion of the participants of the survey environmental uncertainty in Nigeria had reached a very high level and along with socio-political instability it was very unsupportive for the development of the manufacturing sector in Nigeria. It was also found that the participants of the survey saw a high level of influence of foreign products on the Nigerian manufacturing sector and they believed that the Nigerian sector was very open to the adaptation of new technologies and machineries in their manufacturing process. Availability of finance was also identified as the most important barrier for the development of the manufacturing sector by all of the participants of the survey.

5.3 KEY FINDINGS OF SECONDARY RESEARCH

The secondary analysis of data provided more detailed understanding of data focused on gathering and reviewing information about different aspects of the topic and thus the key findings of secondary research are also arranged according to the topic explored, reviewed and explained in the literature.

5.3.1 The Manufacturing Industry – History and Developments

The review of the studies related to the history and development of the manufacturing industry revealed that the manufacturing industry had become an integral part of the business world after going through several phases of innovation and restructuring. Manufacturing began when people started paying attention towards industrialization along with other activities like agriculture, etc. The invention of new tools and techniques further added to the scope of the manufacturing industry and the emphasis of people towards the manufacturing industry resulted in the invention of different products like bicycles, vacuum cleaners, etc. in the early days of manufacturing. After that people carried on working by modifying the objects and manufacturing products for different type of uses. In the present day, manufacturing has become a separate industry that possesses great importance from an economic perspective. Consumer goods manufacturing is also an important part of the manufacturing industry and experts believe that to accelerate the economic growth of a country, it is necessary that the manufacturing sector must support the economy of the country by contributing a good share towards the GDP.

Advancements in technology have paved the way for manufacturers all over the world and at present, modern day manufacturing is quite different from the manufacturing of the early days. Advancements are happening in the manufacturing field at very high speed and consumers are also becoming more demanding regarding the features and attributes of the products. Technological impact on the manufacturing sector has been mainly due to the invention of new techniques and machinery that adds to the efficiency of the manufacturing sector, by lowering the cost and time of production. At the same time, technology has also added to the rise in competition in the manufacturing sector. Due to the development of communication technology, consumers of today have more knowledge and awareness about products and are more demanding. Thus, to satisfy the needs of these consumers, manufacturing companies are also required to be more focused on the quality and standard of their products. In this regard, manufacturing companies are required to adopt innovative strategies in their product design and also have to design the product with shorter life cycles, so that they can offer the consumer new products very quickly according to their rapidly changing demands. Thus, the secondary analysis of data provided a complete understanding of the manufacturing industry; its beginning, its development and the impact of technological advancement.

At the same time, secondary research also explained the importance of the manufacturing sector for economic growth and it was proved in different studies that the manufacturing sector can contribute efficiently to economic growth if the share of manufacturing to GDP is high. Secondary research also presented some evidence from different countries and in China, the manufacturing sector accounts for a good portion of GDP and the economic growth of the countries studied is accelerating. In 2009, manufacturing sector contribution to GDP in China was 47%, while in Nigeria it was less than 4%. This explanation helps in establishing the fact that the growth of the manufacturing sector is very important for the economic development of any country. Secondary research also highlighted fast moving consumer goods (FMCG) manufacturing and it was revealed that this is an important part of the manufacturing sector. In this way the first section of the secondary analysis of data explained the background of the topic of the thesis by describing the importance and significance of the manufacturing sector for economic development.

5.3.2 Measures of Performance of the Manufacturing Sectors

One of the important objectives of the secondary analysis of data was to find out the reasons for the selection of three attributes (product design, manufacturing systems (manufacturing strategy, manufacturing process and innovation) and environmental uncertainty) as the measures of evaluating the performance of the manufacturing sector. These three attributes were used as the performance measures throughout the research study and the Nigerian manufacturing sector was examined on the basis of these factors in the survey. At the same time these factors were also used to conduct the comparative analysis of Nigerian manufacturing sector with other countries. Thus it is very important to justify why these three factors were studied for the examination of the performance of the manufacturing sectors. The secondary research describes the importance and contribution of each of these factors separately for the manufacturing industry and provided the reasons for the selection of these factors as the performance measures for this research study.

It was revealed from the secondary research that within the manufacturing sector product design, innovation, manufacturing strategy and process played an integral role and at the same time the certainty and stability of the environment also affects the successful operations of the manufacturing companies. Product design is an important issue for manufacturing firms to focus on for many years because it is among the basic attributes of the product that can attract the attention of the consumers. That's why the manufacturing companies traditionally give much importance to product design. But in the context of rapid

advancement in technology product design has rather become a challenge for the manufacturing companies because they have to come up with such unique and attractive product designs that can help them to survive in the highly competitive marketplace. At the same time they can grab the attention of highly demanding consumers only through the uniqueness of their product design. Thus the present situation requires more concentration on product design and the manufacturing sectors focusing on these issues are successfully surviving in highly competitive markets. Whereas the manufacturers ignoring the importance of product design are at higher risk of losing their market position and consumers due to the negligence of this important issue. In the light of the importance of product design for the manufacturing companies it becomes clear that if one wants to evaluate the performance of any manufacturing sector, then product design of that sector must be reviewed and examined to determine the level of manufacturing in that sector. Thus product design was selected for the examination of manufacturing sector performance in this research study also keeping in view the crucial importance of this attribute for the manufacturing industry.

In the same way it was also found in the secondary research that innovation is one of the success factors for manufacturing companies. The manufacturing sector has to focus a lot on innovative ideas for the manufacturing of their products so that they can justify their operations and output in accordance with the modern world and advanced lifestyle of the consumers. In the technology-driven world, the consumers are also changing their way of life after getting inspired from technology advancement due to which they demand products that match their living standards and lifestyle. Consumer products are more closely affected by this changed thinking style because the FMCG are used by the consumers in their daily routine where they want to see innovative changes. Thus manufacturers of consumer goods also have to work more on innovation so that they can fulfil the expectations of the consumers.

In this regard manufacturing firms are not only required to innovate in their product designs but also manufacturing processes by adopting new technology and techniques of manufacturing. The review of the studies further explained that the manufacturing sectors that have brought innovation in their operations and activities are successful in maintaining and stabilizing their market position. Manufacturers lagging behind in innovation are facing serious problems in retaining their market position. Thus the examination of the performance of a manufacturing sector also required the analysis of innovation in the sector.

For this research study this factor was selected as the performance measure and it was found from the secondary research that it is important to judge a manufacturing sector on the basis of the innovative ideas, concepts and strategies adopted by that sector.

Another important factor is manufacturing process, which was also explained with the help of the secondary analysis of data. According to the findings of the secondary research, manufacturing process is also the critical factor for evaluating the performance of any manufacturing sector. The manufacturing sector determines the success and quality level of the products designed by manufacturing companies and it is also very important that the companies operating in the manufacturing sector must update their processes according to the changes occurring in the surrounding environment. Due to technological advancement manufacturers are required to bring modern machinery and techniques within the manufacturing process so that the manufacturing process followed by these companies can be evaluated according to international standards.

It is revealed from the secondary research that manufacturing companies in the modern era are in much need of restructuring their manufacturing process on a short-term basis in order to keep up with advancements. Companies following the up-to-date manufacturing process can expect that they will retain their existing consumers and will increase the number of their consumers as well. But companies following an out-dated manufacturing process cannot become successful because consumers want to see new features in the products every time, which is possible only by following updated manufacturing processes. Thus this is also an important factor that is important to judge for the evaluation of the performance of the manufacturing sector. This research study also judged the performance of the Nigerian manufacturing process by analyzing the manufacturing process followed by the companies operating in the country.

The secondary analysis of data also provided understanding about the importance of the manufacturing strategy and it was found that the adaptation of adequate manufacturing strategy is also important to the success of the manufacturing sector. Previous researchers have focused a lot on the importance and significance of manufacturing strategy because it involves all the major decisions that have to be taken by the manufacturing firms' management regarding the place, material and methods of manufacturing the product. If management adopts the right strategy and takes the correct decisions for the selection of the location for manufacturing of their products they can have an easy access to labour and

raw materials. The manufacturing firm can then accomplish its operation while taking advantage of the low cost of labour and products. In the same way, if the management makes any mistakes in the selection of the manufacturing unit for the products then the operations of the company can be affected badly and the company might face different sorts of problems.

Thus it was revealed in the light of the review of the studies that manufacturing strategy was also an important component of the manufacturing strategy and the success of the sector largely depends upon the strategy adopted by the management of the company. That is why the manufacturing strategy adopted by Nigerian firms was also reviewed and analyzed in the survey so that there could be an understanding of the manufacturing strategy of the Nigerian manufacturing sector and on the basis of this factor the performance of the sector could also be evaluated.

Another important measure selected for evaluating the performance of the Nigerian manufacturing sector was environmental uncertainty and secondary research also provided deep understanding of the issue of how uncertainty in the environment can affect the performance of the manufacturing industry. It was revealed from the secondary analysis of data that the availability of the work force and raw materials needs a favourable business environment. But if there is instability in the operating environment due to any socio-political issue then the manufacturing companies will also face problems in making several decisions regarding their operations. The uncertainty in the operating environment creates much confusion in the minds of the manufacturing company management and their decision making power is badly affected. In the same way the physical problems in the operating environment, like pollution issues, also affect manufacturing industry performance and the companies need stability in the surroundings to focus on their objectives. The secondary research made it clear that environmental uncertainty possesses great potential to affect the performance of the manufacturing sector so the manufacturing industry needs a stable environment to grow. Thus it was proved that this factor is also very important for the evaluation of the performance of the manufacturing industry due to its influence on the activities and operation of the manufacturing industry.

In this way all the selected performance measures were explained in the secondary analysis of data and their relative importance is proved in the light of the review of different social research studies. It was also found that all of these measures are related to each other – for

example product design needs innovation and at the same time innovative ideas need to be implemented within manufacturing processes followed by the manufacturing firms. The certainty in the environment helps the manufacturing companies to adequately follow their manufacturing strategies and conduct their operations in an effective manner. All these are important factors and were studied for the evaluation of the performance of any manufacturing sector and their contribution and significance.

5.3.3 Nigerian Manufacturing sector – Performance and Impact of Oil dependency

The secondary research also focused on reviewing the studies conducted around different aspects of the Nigerian economic conditions and it found that oil dependency played major role in determining the economic conditions of Nigeria. The country possesses major reserves of oil in the region and is among the largest exporters of crude oil in the world, but despite this fact the economy of the country is not stable. Due to the oil price spike in the 1980s Nigeria faced a critical situation and there was massive drawback in the export revenue of the country. Fluctuations in oil prices further added to the economic instability of the country and most of the population of Nigeria was compelled to live below the poverty line. This was because the other industries were not developed and the oil sector revenue was not stable in the global market. Thus, Nigeria faced economic drawbacks mainly due to the fact that the government of Nigeria did not concentrate on the development of other industries and as a result the other industries failed to support the economy of the country in the critical situation. After the phases of price fluctuations and their impact on the economy of Nigeria, the government realized the importance of concentrating on other industries so that the economy of the country could be diversified and the impacts of the oil price fluctuation could also be minimized. Thus there were several plans and strategies implemented by the government for trade liberalization so that other industries including the manufacturing sector can grow and support the economy. Some of these steps proved positive and the companies were facilitated to work efficiently in the sector. Moreover some of the reforms further added to the difficulties of the manufacturing companies and found it difficult to be competitive in the emerging situation.

The manufacturing industry development is now regarded as very important in Nigeria because there are millions of consumers in the country and millions in the neighbouring countries that are potential markets for products manufactured in Nigeria. If the Nigerian manufacturing sector succeeds in meeting the expectations of the consumers, then the country can easily generate good revenue and can get support for economic development.

The secondary research also disclosed that at present the situation is not very positive in the manufacturing industry of Nigeria because the sector is not performing efficiently to contribute to economic growth. There are many issues and limitations that were identified in the secondary research as the reasons behind the inefficient performance of the Nigerian manufacturing industry. The basic industries have not been developed in Nigeria due to which the firms have to import raw materials for the manufacturing of the products from different countries and for this they have to pay high import duties and tariffs. As a result the cost of production rises for these companies and they fail to manufacture cost effective products. The infrastructure of the country is also not developed enough to support the manufacturing activities and the supply of energy resources is also not adequate in the country due to which the firms are unable to carry on their manufacturing process. At the same time manufacturing companies face many difficulties in getting finance from banks and other institutions due to which research and development is also lacking in the sector. Lack of financial resources also results in difficulties of the manufacturing companies to adopt updated manufacturing processes because they are unable to introduce new technology and machinery in their business due to the high cost.

Some other factors that hinder the growth of the manufacturing sector in Nigeria were also identified in the secondary research and it is found that due to corruption at government level the manufacturing industry is unable to get the amount of donations and aid granted to it by different international institutions and organisations. As a result of this there is no improvement in the performance of the sector despite getting aid from organisations like the African Development bank, etc. Workers are also getting low salaries in Nigeria and the level of skills and technical knowledge is also very low in the workforce thus there is a need for training and skill development. At present the government is regarded as supportive for the manufacturing industry by some but in the view of many others the role of government should also be more positive for the sector.

The need for the government to take some positive initiatives that can work for trade liberalization and improvement in the performance of the manufacturing industry were also identified. It is found that due to the abovementioned factors the manufacturing sector has been growing in Nigeria at a low speed and the contribution of the manufacturing output is also very low in the total GDP. In order to attain sustainable economic growth, the researchers put a lot of stress on the need for reforms in the Nigerian manufacturing sector. Along with the abovementioned fact it is an important finding of this research study that

other researchers have not evaluated the performance of the Nigerian manufacturing sector on the basis of different performance measures like product design, innovation and manufacturing strategy. As a result, there are many issues that remain to be investigated based on the secondary analysis of data. Some issues like uncertainty and innovation are discussed by the researchers in reference to the Nigerian manufacturing industry but none of the researches focuses on the different performance measures to evaluate the performance of the Nigerian manufacturing industry. Moreover the performance of the Nigerian manufacturing sector has never been compared specifically with developing countries such China, India and Malaysia. Due to this fact there are only a few strategies of the developing countries that are found workable for Nigeria. There is a clear gap found in the literature as a result of the secondary analysis of data and this research study filled these gaps by discussing the issues missed by other studies, with the help of the results and analysis of the statistical survey answers.

5.3.4 Manufacturing Sectors of China, India and Malaysia

The research study is also aimed at comparing the performance of the Chinese, Indian and Malaysian manufacturing sectors with that of Nigeria and in this regard the secondary research was employed to collect information about the manufacturing sectors of these countries. With the help of a review of different research studies the manufacturing sectors of these developing countries were studied and their performance analyzed with regard to the policies of the government and other factors.

It was revealed from the secondary research that the Indian manufacturing sector was progressing well and the contribution of the sector was also significant in the total GDP of the country. However critics have argued that the government of India must set a high target for the manufacturing sector so that the rate of GDP could be increased further. It was found that the Indian manufacturing sector is supported by government policies and measures to keep the trade regime liberal. The basic industries are also developing in the country to support the activities of the manufacturing sector. The research study also made it clear that the technical capability of the sector is an important factor behind the success of the Indian manufacturing sector. The sector also provides employment to a large portion of the population; the private sector is also contributing to manufacturing industry activities due to the facilities provided by the government. The research studies also identified some of the critical factors and highlighted the need for reforms in the manufacturing industry of India. It was observed that the manufacturing sector in India is required to increase output,

and the policies of the government need to be more favourable to the manufacturing industry. An important attribute of the Indian manufacturing sector was also identified by the research: that Indian manufacturers are giving due attention to the issue of innovation and as a result they are coming up with new ideas for their product design and manufacturing processes. This is an important success factor behind the growth and development of the Indian manufacturing sector. The researchers still believe that there must be more investment on research and development work so that new techniques can be introduced in the sector. The government should also be working towards providing different guidelines to the companies so that they can progress well and maintain high standards.

The secondary research also portrayed the position of the Malaysian manufacturing sector and it revealed that it is facing tough competition from other countries in the region and the sector has gone through several phases of ups and downs to reach the current position. It revealed that the role of the government has always been very important for the growth of the sector in the country and it is very important that the government should further implement policies and strategies that can work for the improvement of the situation. Foreign investment is also very high in the country and it is identified by the researchers that an increment in foreign investment is a significant sign for the manufacturing sector. There must be more steps for trade liberalization so that the companies can be facilitated and encouraged to work well in the sector. The contribution of the manufacturing sector to the total GDP of the country is very significant and almost one-third of GDP is contributed by the output of the manufacturing sector in Malaysia. The present investment regime is also open to investors due to which there are domestic and foreign companies financing manufacturing industry related activities. Research and development work is also progressing well in the country. However, the sector is also facing many problems and challenges due to increased competition and they have to assure the timely delivery of manufactured products to consumers to remain competitive in the marketplace. At the same time, issues of human resource management, skilled labour, technical adoptability and the cost of production are very important points for the operators of the Malaysian manufacturing sector.

The study of the Chinese manufacturing sector shows many positive signs that confirm the efficient performance of the sector and its support for the economic development of the country. At present China has a major share in the manufacturing of consumer goods at

international level and the products manufactured in China have been exported to many countries due to the low cost of production and quality of these products. An important attribute of Chinese manufacturing is identified in the research studies review: Chinese manufacturers focus a lot on product design and quality to remain competitive – at the same time the prices of manufactured products are low in China. This is why many countries set up their manufacturing sites there. However after the rise in the prices of petrol and other energy resources, China is also struggling to keep the prices of the products at a low level. At the same time the issue of availability of skilled labour is an important challenge ahead of the Chinese manufacturing industry because the introduction of modern machinery requires highly skilled labour for operating the machinery.

The role of the government is very important behind the success of the Chinese manufacturing industry and it was identified by the researchers that China is an open trade regime due to which foreign and domestic investors are encouraged to invest in the manufacturing industry. As a result not only is the manufacturing sector flourishing but the other related industries are also growing well due to foreign investment. The technology adoptability is also key to the success of the Chinese manufacturers because they have to focus a lot on the modern ways of manufacturing and through adequate research and development work, Chinese manufacturers have brought innovation within their product designs and manufacturing processes. Thus, the secondary research provided a better understanding of all the issues related to the research study and the background topics associated with the thesis. The secondary research explained different concepts and features of the manufacturing industry and also described the position and performance of the manufacturing sectors of Nigeria, China, India and Malaysia. This explanation is helpful in conducting the comparative analysis of these manufacturing sectors.

5.4 KEY FINDINGS FROM THE FOCUS GROUP INTERVIEW

The focus group interview was conducted by identifying 10 experts based on their knowledge and work experience in the manufacturing industry in Nigeria and also in countries like China, India and Malaysia. The questionnaire was constructed with 15 open ended questions which targeted at investigating the role of product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty in the performance of Nigerian manufacturing sector. The questions also focused on comparing the performance of manufacturing sectors in China, India and Malaysia with that of Nigeria.

Question 1: ***Distinguished participants, can you briefly introduce yourselves with special emphasis on your local and international manufacturing experience as it relates to product design, manufacturing process, manufacturing strategy, innovation and environmental challenges in the Nigerian Manufacturing sector?***

The first question collected details about the participants' work experience in the manufacturing industry in Nigeria as well as in the international market. To maintain confidentiality, the real names of the participants were not disclosed and some codes were used for identification

Question 2: ***What factors do you think play the most important role in impeding effective Product design, manufacturing process, manufacturing strategy and innovation within the Nigerian Manufacturing sector?***

The respondents identified a number of factors that are affecting the growth of the manufacturing sector in Nigeria. The respondents never mentioned one single factor as the most influential for affecting the performance of the Nigerian manufacturing sector. It was clearly evident from the responses that all four mentioned factors – product design, manufacturing processes, manufacturing strategy and manufacturing innovation – are regarded as almost responsible for the inefficient growth and development of the Nigerian manufacturing sector.

Question 3: ***What are the major environmental challenges currently facing the Nigerian manufacturing companies?***

The respondents were requested to mention the challenges as there were no choices provided in the question. There were a number of challenges identified by the participants in response. Lack of infrastructure facility, lack of funds and difficulties in availing loans, lack of appropriate technology, overseas dependence for supply of raw materials, strong competition from countries like China, India and Malaysia, lack of government support and inconsistencies in their major policies, consumers' preferences for foreign products, multiple taxation and other charges, low purchasing power of the consumers and Nigerian workers preferring overseas jobs were the most common and agreed upon challenges for the Nigerian manufacturing sector.

Question 4: ***To what extent do you perceive the factors that are impediments to the performance of the Nigerian manufacturing organizations as internal factors that is factors within the control of the organization?***

The factors identified by the participants that are impediments to the performance of the Nigerian manufacturing organizations within the control of the organizations are lack of basic infrastructure facilities, lack of funds, lack of modern machinery and equipments, low salaries and incentives, lack of adoption to updated technology and manufacturing processes, lack research and development work and lack of training and skill development of the workforce.

Question 5: ***To what extent do you perceive the factors that are impediments to the performance of the Nigerian manufacturing organizations as external factors that is factors outside the control of the organization?***

Lack of funds due to non-availability of loans, lack of infrastructure facilities, lack of energy resources and power supply, lack of government support and inconsistencies in their policies, lack of supply of raw materials, lack of government support for research and development work, corruption hindering the inflow of foreign investments, multiple taxation, fees and other charges and decline in the purchasing power of the consumers were identified as the key factors impeding the performance of the Nigerian manufacturing sector, which are outside the control of the organizations.

Question 6: ***What are the key factors confronting the manufacturing firms of Nigeria in maintaining high performance at domestic level?***

Lack of energy resources and adequate power supply, lack of appropriate machinery and equipment, lack of government patronage, inadequate capital, lower consumer spending power, that is low disposal income to spend on quality products, high manufacturing costs and inadequate options in terms of raw materials procurement were identified by the participants as the key factors confronting the manufacturing firms in maintaining high performance at domestic level.

Question 7: ***What are the main influential factors that hinder the high quality performance and growth of the Nigerian manufacturing sector at international level?***

In reply, the participants identified lack of government support providing the tariff rates in favour of the manufacturing companies, lack of basic infrastructure facilities, lack of development in basic industries which forces the procurement of raw materials from overseas, lack of adoption to advancement in technology, lack of modern manufacturing design, processes and strategy to compete in the international market, lack of capital availability and rise in competition from other developing countries as the influencing factors that hinder the high quality performance and growth of the Nigerian manufacturing sector at international level.

Question 8: ***Do you think the present situation has become more challenging and demanding for the Nigerian manufacturing firms as compared with past 10 – 15 years, since the country's return to democratic governance in 1999?***

Most of the respondents totally agreed with the statement that in the present situation Nigerian manufacturing companies are facing a highly competitive, demanding and challenging situation. More than 90 percent of the respondents believe that due to the increasing challenges and demands of the emerging situation, many of the manufacturing companies are struggling for their survival and manufacturing is also declining in the country as there are many new and challenging problems in the operating environment.

Question 9: ***Do you think that as compared with last 10 – 15 years, the Nigerian manufacturing sector will face more challenges and demanding situation in the coming 5-10 years?***

The respondents mostly agreed with this statement as well and more than 70 percent of the participants of the survey expressed their opinion in favour of the fact that a rise in competition and technology advancement has brought many difficulties for the manufacturing firms of Nigeria. They also have many difficulties in aligning their operations and activities in accordance with the changes occurring at international manufacturing industry. The respondents also shared their opinions that in this situation it is necessary that the basic infrastructure of Nigeria must be improved and developed to support manufacturing activities otherwise there are possibilities that the manufacturing environment of the country will further deteriorate. The manufacturing sector is in great need of support in terms of capital availability, increased local manufacturing by introducing tariffs, manufacturing incentives, etc

Question 10: ***Which of the following attributes is weakest in the Nigerian Manufacturing sector in comparison with the Indian, Chinese and Malaysian manufacturing sectors?***

1. ***Product Design***
2. ***Innovation***
3. ***Manufacturing Strategy***
4. ***Manufacturing Process***
5. ***Environmental Uncertainty***

Responses revealed that most of the participants selected environmental uncertainty as the weakest attribute of the Nigerian manufacturing sector as compared with the Chinese, Indian and Malaysian manufacturing sectors. When professionals operating in the Nigerian manufacturing sector compared the manufacturing industry of Nigeria with that of China, India and Malaysia, it was found that the operating environment of Nigeria contains lot of uncertainty. That is the most important factor in weakening the performance and growth of the Nigerian manufacturing sector.

Question 11: ***Based on your knowledge and experience, to what extent do you see the level of difference in the performance of Nigerian manufacturing sector as compared with those of China, India and Malaysia in terms of product design, manufacturing process, manufacturing strategy, Manufacturing innovation, and environmental uncertainty?***

Results indicated that the professionals working in the Nigerian manufacturing sector see a very high level of difference in the performance of the Nigerian manufacturing sector as compared with the manufacturing sectors of China, India and Malaysia, in terms of product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty.

Question 12: ***Based on your knowledge and experience, to what extent does the social and economic stability of China, India and Malaysia make the difference in the performance of their manufacturing sectors as compared with that of Nigeria?***

The results question show that according to the opinion of the participants of the survey, social and economic stability in developing countries like China, India and Malaysia play an important role in making big differences in the performance of the manufacturing sector of these countries as compared with Nigeria. They also believe that Nigeria should follow the

patterns of the development of these sectors to become successful because in these countries economic growth is very well supported by the manufacturing sector and the socio-political stability of these countries has also led to better performance of the manufacturing industry in these countries.

Question 13: ***Based on your knowledge and experience, to what level is the performance of the manufacturing sectors of these countries contributing to the economic growth as compared with that of Nigeria?***

These results show that most of the participants of the survey believed that the manufacturing sector in China, India and Malaysia is supporting the economic growth of these countries at a very high level. The contribution of the manufacturing sectors of these countries towards the total GDP of these countries is also very high compared to Nigeria.

Question 14: ***Based on your knowledge and experience, to what level can the Nigerian manufacturing sector improve by following the policies and strategies of manufacturing sectors of these developing countries?***

Most of the respondents thought that Nigeria can improve if it follows the manufacturing industry growth patterns of some developing countries like China, India and Malaysia. They also believed that Nigeria should follow the patterns of the development of these sectors to become successful because in these countries economic growth is very well supported by the manufacturing sector and the socio-political stability of these countries has also led to better performance of the manufacturing industry in these countries.

Question 15: ***Finally distinguished participants, what are your recommendations and suggestions that the Nigerian manufacturing sector has to emphasise, which will bring improvement in the overall state of the Nigerian manufacturing sector?***

Though the respondents gave different suggestions and recommendations, overall their opinions and views focused on similar issues. The participants of the survey suggested that for an improvement in the performance of the Nigerian manufacturing sector it is necessary that there must be an improvement in the basic infrastructure of the country for manufacturing activities and operations.

Participants of the survey also suggested that the adequate supply of energy resources like electricity and gas is also crucial for the smooth flow of the manufacturing process. Therefore government and related authorities must make arrangements that can work for the improvement of energy supply to the manufacturing industry. The railways, roads and communication network also require the attention of the authorities so that the manufacturing companies can easily conduct activities like the supply of raw material, logistics and distribution of finished goods, etc. At the same time it is also very important that manufacturing companies must give attention towards the issue of technology adaptation and there must be investment in the manufacturing sector that can enable these firms to adopt better technology and to have modern and updated technology.

In this regard the training and skill development of the workforce is also necessary and the manufacturing companies of Nigeria must look towards opportunities and options through which they can arrange for attachment with overseas and multinational companies. In this way they can keep in touch with the modern manufacturing process and can also adopt some of their techniques and methods according to the requirement and capabilities of their own industry. It is also recommended by the professionals who participated in the survey that the present level of salaries is not attractive and this is one of the main reasons behind the lack of motivation of the workers. Thus it is also important that there must be an increment in the salaries and incentives of the workforce associated with the manufacturing sector so that they can get better facilities and incentives and can work for their companies in an efficient manner with more dedication and motivation.

It was also recommended by the participants of the survey that the companies operating in the Nigerian manufacturing sector need to revolutionize their ways of operations and they should look towards new methods and techniques of manufacturing to keep their products updated with modern technological advancements. There is a great need for an improvement in the quality and standard of the products manufactured within the Nigerian industry so that it can satisfy the needs of the consumers in an effective manner. For this it is very important that the companies carry on their manufacturing activities with the help of updated technology and adequate and modern manufacturing processes. There are some other issues also highlighted by the participants of the survey who recommended that the Nigerian firms should also focus on better marketing strategies so that they can promote their products at the domestic and international markets in an effective manner and thus increasing the number of consumers.

The government being an important player in the entire situation needs to emphasise the many important issues related to the manufacturing industry and in the view of the surveyed participants, the government needs to work for the improvement of tariff rates in favour of the manufacturing companies of the country. They should also take steps for the development of basic industries in Nigeria, so that the manufacturing companies can easily get cheap raw materials for manufacturing their products. However, they may have to cope with globalisation which supports free market concepts that may possibly make it cheaper to import their required raw materials. Research and development work is also lacking in the Nigerian manufacturing sector so it is very important that research and development must be supported and encouraged at all levels including at university and government levels, so that the entire manufacturing sector can get the benefit of this work and can update their strategy and manufacturing process according to the requirements of the new situation.

Moreover it is also suggested by the professionals who participated in the survey that there must be a complete overhaul of the energy generation and supply systems. It is necessary that the energy-based companies must be encouraged and facilitated to invest in power generation, transmission and distribution. Specifically, it should be compulsory for the oil companies operating in Nigeria to participate in low cost power generation and supply to manufacturing industries. Firms operating in the manufacturing industry must also be facilitated and supported to get finance from different banks and other financial institutions at competitive rates. At the same time it is also necessary for recognition of the ICT contributions in the manufacturing industry both at government level and at the private level so that the manufacturing companies can understand the importance of ICT and can adopt it according to the requirement and capabilities of industry and can improve the quality and standard of manufactured products.

5.4.1 Focus Group Interview Participants' Overall Perception of Nigerian Manufacturing Sector

According to the experts who participated in the focus group interview, there were many factors that are affecting the growth and development of Nigerian manufacturing sector. The selected measures of this research such as product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty played an equally important role in impeding the growth of the manufacturing sector in Nigeria. The participants expressed the need for improvement in the basic infrastructure facilities such as railways, roadways and communication. Lack of energy resources and inadequate power supply is hindering the high quality performance of the manufacturing sector.

The sector needs to adopt better technology to ensure new and modern machinery and equipment which help in improving and maintaining a high performance standard in the domestic and international level. At present, the manufacturing sector is not open towards the usage and adoption of technologies and skills and hence, there is stagnation and negative impact on efficiency of the sector. Participants were of the opinion that there is a need to improve the quality of products, reform the marketing strategy and manufacturing processes by adopting the updated technologies. Inadequate capital is a main factor hindering the high quality performance of the Nigerian manufacturing sector. Lack of government support in developing the basic industries has lead to insufficient supply of raw materials. The manufacturing companies are forced to procure the raw materials from overseas which resulted in high manufacturing costs.

Inconsistent government policies and multiple taxations and other charges have also lead to high manufacturing costs. The private sector players also failed to contribute in the manufacturing industry due to import barriers, tariffs, licenses and other policies which resulted in unavailability of raw materials. Participants also highlighted that there is gross under utilization of resources and very low capital utilization in the manufacturing sector due to frequent power problems, decline in demand for the manufactured products and frequent strikes and lockouts by the workers and also the employers.

Participants insisted that there is need for investment in research and development work not only by the manufacturing organizations but also enough support is needed from the government. Manufacturers and investors need motivation and encouragement which will ensure investments in various manufacturing companies. The participants were of the view that workers from Nigeria prefer overseas jobs because of low salary and incentive in the Nigerian manufacturing sector. There is a need for focus in training and skill development for the Nigerian workforce. Consumer prefers foreign products and also the purchasing power of the consumers is on the decline.

Participants also felt that the Nigerian government and public, private and multinational organizations should support and fund the academic research and development work by the universities and institutions, which can help in reviving the declining manufacturing sector. Most of the respondents believe that due to the increasing challenges and demands of the emerging situation, many of the manufacturing companies are struggling for their survival

and manufacturing is also declining in the country as there are many new and challenging problems in the operating environment.

5.4.2 Manufacturing Sectors in China, India and Malaysia as Analysed by the Focus Group

Professionals operating in the Nigerian manufacturing sector compared the manufacturing industry of Nigeria with that of China, India and Malaysia and they found that the operating environment of Nigeria contains a lot of uncertainty. That is one of the factors in weakening the performance and growth of the Nigerian manufacturing sector. Participants were of the opinion that the standard of the Nigerian manufacturing sector is very low when compared to developing countries like China, India and Malaysia. According to the opinion of the participants of the survey, social and economic stability in developing countries like China, India and Malaysia play an important role in making a big difference in the performance of the manufacturing sector of these countries as compared with Nigeria.

China focuses on manufacturing products with innovative and advanced features, with shorter life cycles and at low prices because of which the country holds a major share in the global manufacturing industry. China has become an important and successful player in the global market because of which the economic development of the country is also increased. Most of the participants in the survey believed that the manufacturing sector in China, India and Malaysia is supporting the economic growth of these countries at a very high level. The contribution of the manufacturing sectors of these countries towards the total GDP is also very high compared to Nigeria. This is supported by the fact that as at 2009, manufacturing sector contribution to GDP in China, India and Malaysia was 47%, 18% and 48% respectively while in Nigeria it was less than 4%. The participants identified that adequate investments in the research and development work is the main factor which has contributed towards the efficient performance of the Indian manufacturing sector. Adapting to new techniques and modern technology and favourable regulatory reforms were the main factors for the improvement in the Indian manufacturing sector.

Participants were of the opinion that there is huge difference in the performance of the Nigerian manufacturing sector when compared to the manufacturing sectors of China, India and Malaysia in terms of the selected performance measures such as product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty. The experts were of the opinion that the support from the government is a key factor in the high performance and growth of the manufacturing sectors

of China, India and Malaysia. The Malaysian government had allocated high capital and resources to promote the heavy industries which has resulted in the economic stability of the country.

Foreign investment is high in these countries and enough attention is paid to investments in research development work so that new techniques can be introduced in the sector. China has opened the country to international investors and manufacturers in an attempt to liberalize which has ensured reasonable inflow of FDI into the country. The Malaysian government implemented economic reforms along with liberalization of the manufacturing industry because of which there are only few restrictions and barriers in the sector. The experts were of the view that Nigerian manufacturing sector should follow the patterns of development in China, India and Malaysia in implementing the strategies for improving performance.

5.5 Matching the Results of Primary Research (questionnaire survey and focus group interview) and Secondary Research

The above discussion explained in detail the key findings of the three-step research approach employed that is the secondary research with respect to different aspects and issues discussed in the secondary analysis of data. Prior to that the key findings of the primary research (step 2 – quantitative questionnaire survey and step 3 – qualitative focus group interview) are also presented with the help of qualitative arguments, calculations and graphs and different aspects and issues of the research study discussed in the primary research also become clear in the light of the primary research findings.

The findings of the primary and secondary research show that there is little contradiction between the existing work of the researchers and the practical evidence collected from the business world because most of the problems and issues identified in different social scientific research are further confirmed by the opinions of the participants of the survey. For example it is found that most of the researchers are disappointed with the performance of the Nigerian manufacturing sector and see the sector as very unsupportive of the economic development of the country. In the same way participants of the survey also expressed the view that the present performance level of the manufacturing industry is very low in their opinion. Likewise the measures of manufacturing sector performance are also regarded as very weak in the primary research.

In the secondary research also there is an overall impression reflected that product design, innovation, manufacturing strategy and process adopted by the Nigerian manufacturing firm is not up-to-date with the demands of the modern era. The uncertainty in the environment further adds to the difficulties of the manufacturing industry. Participants of the survey also regarded the uncertainty in the operating environment as the most influential factor responsible for low-level performance of the manufacturing sector in the country. In the same way there are some common problems and limitations identified by the researchers and the participants of the survey that are acting as barriers for the growth and development of the manufacturing industry in Nigeria.

Researchers and participants of the survey agreed upon the fact that the problem of inadequate supply of energy resources, raw materials and spare parts, lack of technology adoptability, lack of economic diversification, low level of technology adoptability and low level of concentration upon the research and development work are the main limitations faced by the manufacturing sector in Nigeria. They also stressed the supportive role of the government for manufacturing industry growth and development.

Secondary and primary research findings also highlighted an important point that there are some issues and aspects related to the research study that are not discussed in the social research works done so far but in the primary research these issues are discussed in detail. For example product design, manufacturing strategy, manufacturing process and innovation in the Nigerian manufacturing sector is not discussed in the social studies separately and in detail.

There is mostly an overall view of the entire situation presented by most of researchers but in this research study, the primary data came up with an in-depth review of all these issues. The views of the high level professionals operating in the manufacturing industry were used for exploring the performance of the Nigerian manufacturing sector specifically in terms of the three selected performance measures and this is the thing that was lacking in the secondary research. This gap was also identified in the review of the literature and in order to fill it the primary research was conducted and the missing aspects of the issues were discussed in detail with the help of the statistical survey conducted among 400 manufacturing firms of Nigeria.

In the same way the primary research also prepared the background for conducting the comparative analysis of the performance of the Nigerian manufacturing sector with that of China, India and Malaysia. It was found during the review of the literature that this point is also missing in the existing research studies and the researchers have worked out little for the in-depth review and comparison of the Nigerian manufacturing sector with others. In order to fill this gap, the primary research was conducted and a separate section was included in the survey questionnaire so that the respondents of the survey could express their view about the comparison of the performance of these manufacturing sectors in detail and specifically in terms of the three selected performance measures.

Thus there were two major literature gaps to fill with the help of the primary research. It was concluded from matching the primary and secondary researches that there is great support from the secondary findings for the primary research findings because the observations of the researchers are almost the same as the experiences of the personnel operating in the manufacturing industry of Nigeria. At the same time, the points missed by the researchers have also been explored with the help of the opinions of the participants in the survey.

Focus group interviews in the study identified a number of problems and possible solutions for the Nigerian manufacturing sector. They recommended adequate supply of low cost energy resources like electricity and gas for the smooth flow of the manufacturing process. Therefore, the government and related authorities must make such arrangement to improve the energy supply to the manufacturing industry.

Railways, roads and communication network also require the attention of the authorities so that manufacturing companies can easily conduct activities like the supply of raw material, logistics and distribution of finished goods, etc. At the same time it is also very important that manufacturing companies must give attention towards the issue of technology adaptation and there must be investment in the manufacturing sector that can enable these firms to adopt better technology and to have modern and updated technology. These were the possible solutions to the energy and infrastructural problems in Nigeria affecting the entire economy.

The group also identified the need for training and skill development of the workforce in manufacturing companies. These companies must look forward for opportunities and

options through which they can arrange for training with overseas and multinational companies. In this way they can keep in touch with the modern manufacturing process and can also adopt some of their techniques and methods according to the requirement and capabilities of their own industry.

The focus group also revealed that the present level of salaries is not attractive and this is one of the main reasons behind the lack of motivation of the workers. Thus it is also important that there must be an increment in the salaries and incentives of the workforce associated with the manufacturing sector so that they can get better facilities and can work for their companies in an efficient manner with more dedication and motivation.

The focus group interview established that the companies operating in the Nigerian manufacturing sector need to revolutionize their ways of operations and they should look towards new methods and techniques of manufacturing to keep their products updated with modern technological advancements. There is a great need for improvements in the quality and standard of the products manufactured within the Nigerian industry so that it can satisfy the needs of the consumers in an effective manner. For this it is very important that the companies carry on their manufacturing activities with the help of updated technology and adequate and modern manufacturing processes.

The focus group in the interview also recommended that the Nigerian firms should focus on better marketing strategies so that they can promote their products at the domestic and international markets in an effective manner. In this way the sector can be able to improve the quality of their products. The focus group discussion also identified the government as an important player in aiding the manufacturing sector. Therefore, the government needs to emphasise the many important issues related to the manufacturing industry and according to the focus group, government needs to work for the improvement of tariff rates in favour of the manufacturing companies within the country.

From the literature review the previous situation and current situation of the Nigeria's manufacturing sector has been highlighted. The opportunities available within the manufacturing sector and the problems the sector is still facing despite the government and the private sector efforts to curb these problems have been identified. These problems and opportunities identified in the secondary sources were confirmed from the survey and the focus group interviews. The survey and the focus group interviews also established a number of possible solutions to the problems facing Nigeria's manufacturing sector from the

expert opinions provided in relation to manufacturing process, manufacturing strategy and innovation, environmental uncertainty, effects of technology and the significance of product design. The survey and the focus group interviews identified several factors that facilitate/hinder the development and growth of the manufacturing sector in Nigeria.

The above discussions presented a detailed account of information related to the manufacturing sector performance of Nigeria, India, China and Malaysia. From literature, the study identified the Nigerian economy as oil dependent and fluctuations in oil prices in the global market have contributed towards the economic instability in the country. The government of Nigeria is concentrating on diversifying the economies towards the non-oil sector. From the study, the growth and performance of the Nigerian manufacturing sector is in great need of reforms and improvement because productivity is very low.

Both the survey and the focus group interviews attributed this to the following: Poor infrastructure, funding problems, inappropriate technology, strong competition from the global market, dependence on overseas for the supply of raw materials, lop-sided/inconsistent government policy, low purchasing power in the Nigerian market, multiple taxations on the manufactured product, and fleeing of the skilled labour to the overseas for better term of employment.

The same respondents from the survey and focus group interviews suggested the following as solutions to the above obstacle to growth and development of the manufacturing sector in Nigeria.

- Improving infrastructure especially transport and communication facilities,
- enhancement and use of technology in the manufacturing sector,
- better salaries and incentives to the workers,
- improved product quality through adoption of up to date technology and manufacturing process,
- effective marketing and advertising,
- development of basic industries for the supply of raw materials, and
- government and private support for the research and development.

The survey and the focus group tried to establish the contribution of product design on the performance of the manufacturing sector and the economy at large in Nigeria's economy. The study also examined the manufacturing process employed in Nigeria, how the imported raw materials affect the process and whether there is need to restructure the process. The

survey and the focus group interviews explored the manufacturing strategies used in Nigeria and whether these strategies meet the international standard.

The study also tried to find how these strategies influenced the attention and loyalty of consumers. The survey and focus group interviews in addition examined the effects of technology and innovation in the manufacturing sector. From the study, secondary research findings strongly supported the primary findings and many things that are common between the studies and analysis of the researchers and the experiences of the surveyed participants.

5.6 CHAPTER SUMMARY

This chapter clearly explained the key findings of the questionnaire survey, secondary data analysis and focus group interviews. Findings from the secondary analysis of data are presented in the chapter according to the main topics discussed in the literature review and it is revealed that the secondary analysis of data explained all the issues and topics related to the research study. Findings of the secondary research provided a better understanding of the manufacturing industry contribution to economic growth. It also explained the past and present situation of the Nigerian manufacturing sector along with the identification of the main problems and limitations faced by the sector. Moreover the secondary research also enabled a deeper understanding of the importance of the performance measures selected for the evaluation of the performance of the Nigerian manufacturing sector. This is explained in the secondary research findings that the three performance measures (product design, environmental uncertainty and manufacturing systems (manufacturing strategy, manufacturing process and innovation) were selected for the examination of the performance of the Nigerian manufacturing sector. This is because these are the important factors that play a major role in determining the quality of the manufactured products and the companies operating in the manufacturing industry have to focus on these issues to remain strategic towards the attainment of their objectives. Secondary research findings also presented a clear picture of the manufacturing sectors of China, India and Malaysia and these findings were used in conducting the comparative analysis of the performance of the Nigerian manufacturing sector with them.

Along with the secondary research findings, the chapter also presented a detailed account of the information about results and findings of the primary research i.e. the statistical questionnaire survey. The chapter presented the results of the survey according to the different sections and questions of the survey questionnaire. It was revealed from the survey

results that most of the respondents rated product design of the Nigerian manufacturing sector medium and low and there were in favour of a higher level of product design, in the Nigeria's manufacturing sector. It is also found that most of the professionals who participated in the survey viewed the level of innovation in the Nigerian manufacturing sector as medium and low. However, manufacturing strategy was viewed differently by the different professionals and there was a mixed response received for the level of the manufacturing strategy adopted by the Nigerian manufacturing companies. It was also found that in the opinions of the manufacturing industry professionals, environmental uncertainty had the greatest impact on manufacturing sector performance and growth in Nigeria.

The comparison of the Chinese, Indian and Malaysian manufacturing sector with the Nigerian sector shows that more than half of the respondents were very clear in their views that the performance level of the respective manufacturing sectors is very high compared with Nigeria. Results of the statistical survey also disclosed some of the major barriers that hinder the growth and high quality performance of the Nigerian manufacturing sector. They highlighted some of the major problems and issues that are faced by the Nigerian manufacturing sector and created many challenges for survival. The suggestions and recommendations given by the survey respondents also described in the findings of the primary research and all their views regarding the weaknesses of the Nigerian manufacturing sector were explained in detail in this chapter.

This chapter also presented the findings of the focus group interview with the opinion of the experts and their recommendations in improving the performance of the Nigerian manufacturing sector. The research revealed that inadequate capital, lack of basic infrastructure, lack of adoption to new technology, lack of government support, dependence on overseas for raw materials as the key factors impeding the growth of Nigerian manufacturing sector. The experts were of the opinion that the selected performance measures – product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty – were equally responsible in the performance of the manufacturing sector in Nigeria.

Results from the focus group interviews also created the platform for comparing the performance of Nigerian manufacturing sector with those of China, India and Malaysia. The experts were of the opinion that the overall performance of the manufacturing sector in

these countries is very high and suggested that Nigerian manufacturing sector can follow the strategies and development patterns of these countries to improve performance. Experts also recommended the need to reform and revolutionize the manufacturing processes and strategy in improving and maintaining the performance of the Nigerian manufacturing sector.

The matching of the primary and secondary research findings revealed that there is little contradiction between the secondary data analysis, questionnaire and the focus group interviews. The in-depth analysis of the selected performance measures – product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty by the questionnaire survey duly covered the gap which was found in the secondary data analysis. Further, comparing the performance of the Nigerian manufacturing sector with those of China, India and Malaysia, this was missing in the secondary research and was duly filled by the experts' opinion through the focus group interviews. Thus, results of the questionnaire survey and the focus group interviews complimented the findings of the secondary research and also filled the gaps identified in the literature.

CHAPTER 6

DISCUSSION OF RESEARCH FINDINGS

6.1 INTRODUCTION

This chapter discusses the findings of the research study so as to determine the answers to the research questions and thereby achieve the research objective. Findings from the secondary research, questionnaire survey and focus group interviews were analyzed and interpreted in this chapter. Thus some of its contents are similar to what was found in the previous chapter but argued at greater details which enabled the researcher to make definitive logical conclusions.

The chapter contains the examination of the performance of Nigerian manufacturing sector with regard to product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty, which is the main objective of this research. It also contains the comparative analysis of the Nigerian manufacturing sector with those of China, India and Malaysia. In order to conduct this examination, the secondary research findings are used along with the data gathered from the statistical survey and the feedback of experts who participated in the focus group interview. All aspects are discussed in this chapter to show the issues with the help of the secondary and primary research, to ensure that the thesis is headed towards achieving the objectives, which were set out for the research study.

6.2 INTERPRETATION AND ANALYSIS OF RESEARCH FINDINGS

Research results were divided into secondary research findings and primary research findings based on the topics discussed in the literature review and the issues addressed in the survey questionnaire and focus group interviews. The results of primary research complimented the results of the secondary research on certain issues and there were little contradictions. This proved that the observations and studies made by the researchers very well matched with opinion of the professionals and experts from the Nigerian manufacturing sector, who responded to the statistical survey and participated in the focus group interview.

The study of manufacturing from a global perspective and the impact of technology on the manufacturing industry show that manufacturing has emerged as one of the fundamental industries which possess the potential to accelerate the economic growth of Nigeria. Therefore, it is essentially required to focus on the growth and development of this sector to ensure the stability of its economy. Moreover, the impact of technology is very high on the manufacturing sector, with the advent of new techniques and methods of production, making it more and more challenging for manufacturing companies. Manufacturing companies face the challenge of introducing new tools and techniques in their manufacturing process to remain cost effective and at the same time retain the quality and standard of their products. The secondary research provided an in-depth review of the Nigerian manufacturing sector by throwing light on its economic structure, the historical perspective of the manufacturing sector, the main problems and limitations and the current scenario. Secondary data analysis was also conducted with the objective to find out the reasons for selecting the attributes such as product design, manufacturing process, manufacturing strategy, manufacturing innovation and environmental uncertainty as the measures for evaluating the performance of Nigerian manufacturing sector. Further, the manufacturing sectors of China, India and Malaysia were also studied in the thesis to create the background for conducting the comparative analysis with Nigerian manufacturing sector.

It became very clear in the light of the secondary research that the Nigerian manufacturing sector is surrounded by many problems and limitations due to which the performance of the sector is badly affected. Due to these limitations and problems, the sector is not able to follow the same pattern of growth and development as other developing countries. The role of the government also appeared to be less supportive for the manufacturing sector in Nigeria. However, some of the research studies argue that the government has realized the importance of economic diversification and some steps have been taken to encourage the growth and development of the manufacturing sector in Nigeria, but the barriers continue to exist and hinder the growth of the sector. It was evident from the secondary research that liberalization and diversification of economy are the only means through which improvement is possible for the Nigerian manufacturing sector.

Along with the secondary research, a statistical survey was conducted to address some key issues related to the topic of the thesis. The questionnaire survey was conducted among 400 manufacturing firms in Nigeria with the intention of collecting evidence from the business world about the performance and problems of the manufacturing sector. The calculations

and results of the statistical survey, graphically presented in the previous chapter, are interpreted and analyzed in this chapter for better understanding. The questionnaire covered various issues and aspects and the responses were collected from the professionals to understand their views about the performance of the manufacturing sector in Nigeria. Findings from the statistical survey threw light on the performance of Nigerian manufacturing sector in terms of the selected performance measures (product design, manufacturing systems and environmental uncertainty), overall performance of the manufacturing sector and comparison with manufacturing sectors of China, India and Malaysia.

Finally, focus group interview was conducted by identifying 10 experts from the manufacturing industry with the help of a structured questionnaire. The experts were identified based on their knowledge and work experience in the manufacturing industry especially in countries like China, India and Malaysia. The group interview focused on obtaining the views of the experts about the Nigerian manufacturing industry in terms of selected performance measures. Emphasis was on taking experts' opinion in comparing the manufacturing sectors of China, India and Malaysia with that of Nigeria. The group interview resulted with the suggestions and recommendations of the experts in improving the performance of the Nigerian manufacturing sector.

Matching the results of the secondary data analysis, statistical survey and focus group interview helped in examining the performance of Nigerian manufacturing sector based on the selected performance measures – product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty.

6.2.1 Product Design in the Nigerian Manufacturing Sector

The findings of the secondary research revealed the importance of product design for the manufacturing firms in attracting the attention of customers. Findings also stressed that manufacturing companies can survive in the highly competitive market only through unique and attractive product designs and at the same time grab the attention of the highly demanding consumers only through the uniqueness of their products. Further, the research highlighted that manufacturers ignoring the importance of product design are at high risk of losing their position in the market as well as the consumers.

In order to examine the product design of the Nigerian manufacturing sector, a separate section was included in the survey questionnaire in which there were seven questions asked from the participants of the survey about Nigerian product designs. The results from these seven questions were calculated in the last chapter and it was found that the professionals working in the manufacturing industry of Nigeria seemed little satisfied about the skills and capabilities of the workers of the Nigerian manufacturing sector in the perspective of maintaining high standards for product design. There are more responses collected for a medium level of skill and technical capabilities standard because 41 percent of respondents selected Medium. In addition to this it was also found that the manufacturing companies in Nigeria are concentrating hard on product design. It seems that these companies will work positively to maintain the standard of Nigerian manufacturing and the overall revenues of the sector can also increase as a result of their efforts.

However, despite the focus of the manufacturing companies towards product design, the present level of products manufactured by Nigerian manufacturers is not of international level and more than half of the respondents of the survey saw product design at very low level on the international scale. Many of the survey respondents also expressed their disappointment regarding the potential of the Nigerian product designers and they were not very hopeful that these product designers can bring innovation in the manufacturing sector. Survey participants also seemed disappointed due to the fact that the manufacturing companies of Nigeria do little research work before going for product design of their manufacturing goods. As such, the present level and standard of product designs offered by the Nigerian manufacturing sector does not meet the demands and expectations of consumers. At the same time Nigeria cannot stand in the international market with the present level of product design according to the view of the participants in the survey. Thus, there are some disappointments but at the same time some hopes were also expressed by the participants in the survey in the section related to product design.

It was revealed that the professionals working in the manufacturing sector are not satisfied with the present level of product design attained by the manufacturers of Nigeria because they believed that the product design is not up to international standards. Even they were not sure about the fact that this level of product design can meet the demands and expectations of the domestic consumers. However, some hope was expressed and the participants of the survey informed that they saw potential in the Nigerian manufacturing sector in that it possessed the capability to come up with innovative designs. This was

because there is wave of awareness among the manufacturers of Nigeria regarding importance of product design for the success of the manufacturing industry. In this way the participants of the survey evaluated the product designs of the Nigerian manufacturing sector and found that in the coming years there is some hope in the minds of the survey participants but the current situation is just dissatisfying and disappointing for them.

Experts from the focus group interview also expressed their dissatisfaction over the current level of product design offered by the manufacturers in Nigeria. Though the experts agreed with the that manufacturers in Nigeria are working towards improving the current level of product designs, they were of the opinion that the Nigerian work force does not posses the necessary skills and capabilities in coping with technological advancements. Manufacturers in Nigeria are not focusing towards research and development work before arriving at the product designs. Hence, the levels of product designs are currently not up to the standard to compete in the domestic and international markets. Experts also felt that product design is given prime importance by the manufacturers in developing countries like China, India and Malaysia. In comparison with these countries, the standard of product designs in Nigerian manufacturing sector is very low. The experts from the focus group interview also felt that countries like China, India and Malaysia focus on investments in research and development work and work towards innovative ideas to come up with product designs capable of competing in the international market. Moreover, the low standard of product design from the manufacturing companies in Nigeria has led the consumers in preferring foreign products over the locally manufactured goods.

6.2.2 Manufacturing Process in the Nigerian Manufacturing Sector

According to the findings of the secondary research, manufacturing process is one of the crucial measures for evaluating the performance of the manufacturing sector. Apart from providing quality product design, the success of manufacturing companies lies in updating the process of manufacturing keeping in mind the changing market needs. It is essential for the manufacturing companies to introduce new techniques and modern machinery within the process to be evaluated at the international standard.

Manufacturing process is also among the three performance measures that were selected for the examination of the performance of the Nigerian manufacturing sector. In order to conduct the analysis of the sector on the basis of the manufacturing process, there are seven questions constructed within a separate section of the questionnaire and in the light of the

answers to these questions calculated in the last chapter, the performance of the Nigerian manufacturing sector was evaluated and examined. It was found that there are some very important issues that have played a role in determining the progress of the manufacturing process of the Nigerian manufacturing sector. The structural adjustment programmes (SAP) - induced reforms that have also remained a topic of debate among many researchers were regarded by the participants of the survey as the way by which more difficulties entered the manufacturing sector.

The survey participants mostly agreed that the performance of the Nigerian manufacturing sector further declined after the introduction of SAP because the cost of production for the Nigerian manufacturers went on increasing and they have to pay more attention to the import of raw materials and spare parts for the manufacturing of the products. Due to this reason the overall cost of production increased and the growth level of the sector went on declining. Along with the SAP induced reforms, the skills and qualification level of the Nigerian manufacturing workforce is not at a level where they can run an advanced and modern technology-based manufacturing process because they do not possess the required skills and knowledge to handle new tools and techniques of manufacturing. Due to this fact there has been no trend in introducing and using modern machinery and tools in the manufacturing process because the owners of the manufacturing firms are aware that without proper training their workers cannot use the advanced technology-based machinery and tools of production.

As a result the manufacturing process remains at a low standard and the firms use traditional methods to manufacture products. Participants in the survey also made it clear that there is great need for the manufacturing firms to focus upon the issues of lean and agile manufacturing to keep them updated with the emerging concepts and philosophies in the manufacturing industry. Thus there is great need that the manufacturing firms' owners and operators must think over the matter that they should restructure their manufacturing process and keep it updated with emerging concepts and technologies. The present situation of the manufacturing process seems quite unsatisfactory in the eyes of the participants of the survey. They feel there is an essential need to restructure the present manufacturing process followed by the Nigerian manufacturing companies. In this regard they stress the need for adequate infrastructure, skilled labour and usage of advanced machinery and techniques in the manufacturing of the products.

Participants in the focus group interview also accepted the fact that current manufacturing processes followed in the Nigerian manufacturing sector are hindering the growth and development of the sector. They also felt that the Nigerian workforce is not equipped well enough to cope with changing demands and technology and hence manufacturers continue to sustain with outdated technology. The experts were of the opinion that the manufacturing process followed in countries like China, India and Malaysia are up to date as they are adapting to innovation and updating their technology which is lagging in the Nigerian manufacturing sector. They suggested that major reforms are required in the manufacturing process of the Nigerian manufacturing sector.

6.2.3 Manufacturing Strategy in the Nigerian Manufacturing Sector

Analysis of the secondary data revealed the importance and significance of marketing strategies. The manufacturing companies need to formulate the right strategy in identifying the right place for manufacturing, materials required, and methods to be followed and so on. Identification of the right place for manufacturing can lead to choosing the necessary labour and access the required raw materials. The secondary research thus highlighted that correct strategies can lead the manufacturing companies for better operations.

In order to evaluate the performance of the Nigerian manufacturing sector on the basis of the manufacturing strategy adopted by Nigerian companies, a section was dedicated to it in the survey questionnaire. Seven questions were asked of the respondents about the manufacturing strategy adopted by the Nigerian manufacturing sector. The results of this section calculated in the last chapter show that the participants of the survey were not at all satisfied with the current manufacturing strategy adopted by Nigerian manufacturing companies because most of the respondents think that the present strategy is not aligned with the requirements of the present situation. Due to the fact that manufacturing strategy is not up-to-date, the Nigerian manufacturing sector cannot compete with other countries at an international level. Moreover the manufacturing strategy of Nigerian companies looks at such a low level of performance that there is little chance with this unimpressive manufacturing strategy, the manufacturing companies of Nigeria will be able to retain their existing consumers or they will not be able to attract new consumers.

Participants also identifyied that the operating environment of the country is not suitable for the activities of the manufacturing industry. For this reason the strategy adopted by the companies does not appear to be successful in the current situation. Despite the presence of

problems in the operating environment the participants in the survey also blamed the companies operating in the manufacturing sector for the ineffectiveness of the manufacturing strategy because there are lots of flaws in the current strategy. As a result there is an essential need for the manufacturing companies to make some major reforms in the current manufacturing strategy and for this purpose they can also look towards the developing countries and pick from their strategies and planning to implement suitable strategies in their own manufacturing sector.

Thus there is an overall dissatisfaction observed among the participants of the survey and the results of this section clearly indicated that major reforms are required in manufacturing sector strategy as the present strategy is not acceptable at a domestic or international level. The operating environment of the country is also a factor behind the inefficient manufacturing strategy and the manufacturing companies have to remove the flaws from their system by following the patterns of the developing countries like China, India and Malaysia. This can help them in identifying the factors that are creating problems and then find the solutions from policies in the developing countries. In turn, the manufacturing strategy of the Nigerian sector can also reach a level where it can compete with other countries and can also catch the attention of more consumers from inside the country as well as from the international market.

Participants of the focus group interview were of the opinion that the strategies followed by the Nigerian manufacturing sector are inefficient. They also felt that these inefficient strategies are a result of poor operating environment. If the operating environment is not conducive it is very difficult for the manufacturing companies to plan and implement appropriate strategies. Apart from poor operating environment, the participants also identified factors such as lack of financial support, lack of focus in research and development work and poor planning as the reasons for the low level of strategy followed in the Nigerian manufacturing sector. The experts also suggested that Nigerian manufacturers should learn from countries like China, India and Malaysia in terms of planning and strategies so that they can implement the same in ensuring a better performance by the manufacturing sector.

6.2.4 Innovation in the Nigerian Manufacturing Sector

The secondary analysis also revealed that success for manufacturing companies can be achieved by continuous innovation in accordance with the changing trends and advanced lifestyle of consumers. The change is most required in the daily used consumer goods,

otherwise known as the fast moving consumer goods (FMCG), where the need for innovation is high as the demands and expectations of the consumers' change rapidly. The secondary research thus reiterated that manufacturing companies need to be innovative consistently in the designing their products, formulating their strategies and also in the process of manufacturing.

In order to examine innovation in the Nigerian manufacturing sector, there is a section included in the survey questionnaire and there were seven questions asked from the respondents to know about their views regarding innovation in the Nigerian manufacturing sector. It was found from the survey results calculated in the last chapter that the present level of technology usage is not very high in the Nigerian manufacturing sector and many of the participants of the survey see it at medium and low level. Due to this relatively low level of technology usage manufacturing companies also failed to offer consumers many innovative products in the view of the surveyed participants. They also mentioned that a high level of improvement came in the design and features of the Nigerian products compared with the past but despite this improvement, the present level of technology usage and innovation is not satisfactory.

The survey participants also concerned about the fact that in the present wave of globalization and high competition, product design and features in the Nigerian manufacturing sector are not of a standard that can assist the country in its survival. At the same time the survey participants see that manufacturers in Nigeria are becoming more and more aware about bringing innovation into the manufacturing sector but still they do not give much strategic importance to innovation in product design. Thus innovation within product design and the manufacturing process of the Nigerian manufacturing sector was not found at very satisfactory level in the eyes of the professionals working in the sector because they see the present level of innovation and technology usage at very low position.

Although survey respondents have also observed that compared with past the manufacturing companies in Nigeria are doing well from the point of view of innovating new ideas, comparing this innovation level with international standards, it was found that Nigerian firms are performing at a very low level. In this regard the attitude of the manufacturing sector companies is positive in that they are aware of the fact that in order to compete at an international as well as at domestic level they need to be more innovative and strategic towards the adaptation of innovation. However despite this awareness in

practice they are focusing less on innovating new ideas for product design and the manufacturing process due to which the present level of innovation still cannot be evaluated at some satisfactory level according to the opinion of the participants of the survey.

Experts from the focus group were not happy with the current level of innovation adopted in the Nigerian manufacturing sector. Manufacturing companies in Nigeria are not adapting to new technologies and methods and continue to remain with the outdated techniques and methods for manufacturing. As a result, they continue to lag behind in the highly competitive and fast changing world. The experts revealed that countries like China, India and Malaysia are open to innovation and they adapt to latest technological advancements and hence are better off in competing in the global market. Lack of funds, lack of skilled work force and lack of planning are the key reasons behind the low level of strategy followed by the Nigerian manufacturing sector. They were of the opinion that though there is willingness among manufacturers in Nigeria to update innovative technology, availability of funds and lack of government support are affecting the manufacturing sector from being updated.

6.2.5 Environmental Uncertainty in the Nigerian Manufacturing Sector

Secondary analysis of data revealed that the availability of the work force and raw materials needed a favourable business environment. Manufacturing companies have to face problems in making several decisions regarding operations if there is instability in the operating environment due to any socio-political issues. Thus, secondary research made it clear that environmental uncertainty affects the growth and development of the manufacturing sector.

The uncertainty in the environment has proved to be an important and influential factor that can harm the activities and performance level of any business or industry. In order to examine the performance of the Nigerian manufacturing sector the uncertainty in the business environment of Nigeria is also studied and analyzed to trace the impact of this factor on the performance of the manufacturing industry. A section of the questionnaire was dedicated to questions about the impact of environmental uncertainty on the performance of the Nigerian manufacturing sector. With the help of the seven questions included in the section, the responses of the survey participants were collected regarding the environmental uncertainty in the Nigerian manufacturing sector. It was revealed from the survey results that the survey participants are not satisfied with the business environment of

Nigeria and they think that there is very low support for manufacturing sector activities from the operating environment due to which the activities of the manufacturers are also negatively affected. At the same time all of the survey participants strongly agreed with the fact that there are not adequate financial resources for manufacturers in Nigeria due to which the performance of the sector is also very low.

Moreover there is no support from the socio-political conditions for manufacturing companies. Instead there is instability in the business environment due to which the company owners remain uncertain in taking important decisions about their future operations and activities. At the same time it was realized by the survey respondents that if the government of Nigeria takes some positive steps towards bringing stability in the business environment, then the activities and performance level of the manufacturers will be affected very strongly. There is another threat in the business environment in Nigeria in the form of foreign products because in the presence of the foreign manufactured products the level of Nigerian manufacturing products seems even lower. This is because foreign products are of a high standard in product design and innovation and the market value of the Nigerian manufactured products reduces further in the presence of advanced manufactured foreign products. The only hope identified by survey participants in the Nigerian manufacturing sector is the openness of the Nigerian manufacturing owners towards the adoption of technological changes due to which participants thought that some improvements can be brought to the sector. Thus it was revealed from their answers that environmental uncertainty exists in the business environment in Nigeria at a very high level and this factor is influencing the performance and productivity of the Nigerian manufacturing sector. The uncertainty is evaluated in terms of difficulties in getting finance from different institutions and the participants of the survey strongly agreed upon this matter that in Nigeria there is lack of availability of sufficient financial resources. Finally, it was revealed that the high level of uncertainty in the business environment of Nigeria is among the important factors that contribute towards the decline in the performance of the sector.

The participants of the focus group interview were of the opinion that environmental uncertainty is the most important factor in affecting the growth and development of the Nigerian manufacturing sector. Lack of government support and inconsistent policies, lack of financial support locally as well as low foreign investments and multiple taxation and other heavy charges were identified as the key issues affecting the manufacturing sector in

Nigeria. Manufacturing companies are forced to procure raw materials overseas due to lack of development of basic industries in Nigeria which has considerably increased the cost of manufacturing. The manufacturers in Nigeria were not able to adapt to new technologies and be innovative in the product designs, processes and strategies due to the uncertainty in the operating environment. Experts also revealed that countries like China, India and Malaysia are successful because of the stable operating environment for their manufacturing sectors. According to them, the governments of these countries focus on developing the basic industries which creates better operating environment for the manufacturing industries through supply of necessary energy resources and supply of power. The Nigerian manufacturing sector is suffering a lot due to inadequate supply of power and necessary energy resources. The participants also suggested that there should be government intervention in developing the basic industries and creating a stable atmosphere for the manufacturing companies in Nigeria.

6.2.6 DISCUSSION OF THE MAIN ISSUES

The main purpose of the research study was to examine and review the performance of Nigerian manufacturing sector over the last 25 years. This was to identify the key problems and issues surrounding the manufacturing sector and provides some feasible suggestions and solutions to improve the performance level of the sector. The results were followed by a detailed explanation of the present situation of the Nigerian manufacturing sector in terms of the three measures (product design, manufacturing systems (manufacturing strategy, manufacturing process and innovation) and environmental uncertainty) selected for reviewing the performance of the sector. The secondary and primary research findings helped in unfolding all the issues related to the research study and in the light of the research findings the performance of the Nigerian manufacturing sector was also evaluated as compared with the performance of the manufacturing sectors in India, China and Malaysia.

The performance examination and the comparative analysis came up with identification of several problems and limitations responsible for the low level performance of the Nigerian manufacturing sector. It was revealed that Nigeria could also follow the growth patterns of other developing countries but it will require a high level of cooperation, willingness and attention from the government. It appeared that the government of Nigeria is now open towards the diversification and liberalization of the economy and some measures were been taken for the improvement in the performance of the manufacturing industry in Nigeria. But

the practical evidence collected from the business world proved that until now there has been no major improvement in the situation observed by the people operating in the sector and there is further need for revolutionary steps and reforms that can work for the restructuring of the entire manufacturing sector on the basis of the advanced knowledge of modern methods and techniques of manufacturing. The strategies and policies of developing countries like China, India and Malaysia can also be followed by Nigeria but for this it is necessary that the government of Nigeria take major steps in this regard and makes the investment regime of the country as attractive as the Chinese, Indian and Malaysian investment regimes, for foreign investors. For this to happen, policies and trade duties should be minimized and government should also reassure foreign and domestic manufacturers about the certainty in the business environment. Finally, it is concluded that there could be improvement in the performance of the Nigerian manufacturing sector as a result of government decisions. Along with this, manufacturing companies operating in the sector are also required to take some steps towards the improvement of product design, manufacturing process and strategies by bringing innovation to the entire system. They also have to be dedicated towards conducting research and development work, skills development and training of the workforce and adapting to the appropriate technology.

6.2.7 COMPARATIVE ANALYSIS OF MANUFACTURING SECTORS OF CHINA, INDIA AND MALAYSIA, AND THAT OF NIGERIA

In order to conduct a comparative analysis of the Nigerian manufacturing sector with those of developing countries, China, India and Malaysia were selected. The objective of the comparative analysis was to identify the major factors that have contributed towards the differences in the manufacturing sector's performance of these countries. This identification helped in formulating some suggestions that the government of Nigeria and its manufacturing companies could also adopt and implement, so that Nigeria can improve the performance of its manufacturing sector.

In order to conduct this comparative analysis, information and data were collected from the secondary and the primary research approaches. In the first phase, related studies are reviewed to get information about the performance of the manufacturing sectors of these countries. Then, the statistical survey participants were asked questions to compare the performance of these manufacturing sectors. Finally, experts shared their views in the focus group interviews by comparing the performance of the manufacturing sectors of these countries with that of Nigeria based on their working experience in these countries. Results

from the questionnaire survey, focus group interviews and the secondary analysis of data threw light on many aspects of the performance issues and as a result the comparison of the manufacturing sectors of these countries became possible.

First of all, it was observed that the manufacturing sectors in China, India and Malaysia are giving significant output, due to which the contribution of these sectors towards the total GDP of the country is also significant. For example the manufacturing sector of China accounts for more than 34% of its total GDP (Kwan, 2002), the Malaysian manufacturing sector accounts for nearly 30 percent of its GDP (Asian Economic Bulletin, 2004) whereas in India the manufacturing sector's share in GDP has reached 25% (Nilachal, 2004). On the other hand, according to the facts and figures maintained by SASRIC the manufacturing sector accounts for just 3.99% (as in 2003) in the total GDP of Nigeria (SASRIC member profile, 2008). There is a major difference in the contribution of the Nigerian manufacturing sector towards the total GDP of the country as compared with developing countries like China, India and Malaysia and this difference clearly indicates the inefficient performance of the Nigerian manufacturing sector. It also became clear that the sector is unable to support the economic growth of the country in an effective manner. It was also observed that the developing countries like China, India and Malaysia also have differences in their share of contributions from manufacturing sector towards the GDP; for example as at 2003 they had 34%, 25% and 30% respectively which was one of the lowest in the last 10 years. This share has also witnessed several ups and downs but still the manufacturing sector's share towards the GDP of these countries has never dropped down to the level of the current Nigerian manufacturing share in GDP which is less than 7% (CBN, 2010). Moreover, the research studies and reports have also showed that the government and the sector operators are concentrating on increasing the share of the sector further towards GDP whereas the Nigerian manufacturing sector is struggling to maintain an acceptable level of this share – something that looks far away at the present time.

Along with the contribution of the manufacturing sector towards GDP, there are many other aspects and measures that are used for comparing the performance of the manufacturing sectors of these countries. It was found from the survey results that more than 60% of the professionals participating in the survey and working in the Nigerian manufacturing sector evaluate the performance of the Nigerian manufacturing sector as very low were compared internationally. Only 3% of the respondents viewed the performance of the Nigerian sector at a high level in terms of Manufacturing Strategy, Manufacturing Process, Product Design,

Competitiveness, Innovation and Environmental Uncertainty. The experts from the focus group interview were also of the view that the performance of the manufacturing sector in terms of the selected measures were very low compared to the performance of the manufacturing sectors of China, India and Malaysia. These results also show the overall disappointment of the people in the Nigerian manufacturing sector as regards performance.

It was also found that almost 79% of the survey respondents saw large differences in the performance of the Nigerian manufacturing sector in comparison with China whereas just 5% saw little difference. In the same way, the survey results also show that 82% of respondents saw large differences in the manufacturing sector performance of Nigeria and Malaysia. However, the large differences in the performance of the Indian and Nigerian manufacturing sector are witnessed by 75% of the survey participants. These figures further confirm that the Nigerian manufacturing sector is performing very badly according to the opinions of the professionals operating in the sector and they see huge differences in the product design, manufacturing process, strategy, innovation and environment of these sectors. Thus in the light of these results it becomes very clear that according to the performance measures the Nigerian manufacturing sector was evaluated at a very low level as compared with some of the developing countries and the factors studied compared to the sectors of the developing countries.

There are several important factors that have contributed towards these huge differences in the performance level of the manufacturing sectors. According to the survey participants, social and economic stability is an important factor that supports the manufacturing sector operations in China, India and Malaysia, but Nigeria lacks this stability due to which the manufacturing sector is also unable to perform efficiently. In the same manner, Experts from the focus group interview revealed that environmental uncertainty in the Nigerian manufacturing sector is identified as one of the main factors that led to huge differences in the performance of the Nigerian manufacturing sector as compared with that of China, India and Malaysia. These findings show that Nigeria must work towards attaining social and economic stability so that there will be a favourable business environment available for the manufacturing companies and they can be certain about the operating environment in taking certain decisions. This is an important factor that is hindering the growth of the Nigerian manufacturing sector and the other developing countries are performing well in manufacturing because along with many other reasons the stability in the environment supports their activities and operations.

The research study results also revealed that in the Nigerian manufacturing sector many of the performance measures are not followed adequately, whereas the other developing countries are concentrating upon these issues. For example in India the manufacturing sector is focusing more and more on innovation in product design and the manufacturing process. Related authorities and organisations like the Federation of Indian Chambers of Commerce and Industry (FICCI) also realize the importance of bringing innovation in the manufacturing sector so that the overall growth rate of the sector could be increased. However in Nigeria, the business community despite all the willingness to bring improvement is not concentrating much towards innovation of new ideas for product design. In the same way, the researchers have observed that in China the manufacturers place a lot of emphasis on maintaining and increasing the standard and quality of their products through the adaptation of appropriate technology and manufacturing process. In contrast, in Nigeria lack of adequate energy resources and skilled labour prevents manufacturers from focusing upon these issues and as a result the products designed fail to grab the attention of consumers at the international level.

Cost effectiveness of the manufacturing process also appears to be one of the main factors in the manufacturing sectors of these countries. It was found that the developing countries, especially China, focus a lot on minimizing the cost of production so that they can provide consumers and importers with different quality products at low price. In this regard, the sector has adopted several strategies like the adaptation of appropriate technology and the arrangement for easy access to the raw materials. But in Nigeria, manufacturers are not able to adapt to cost effective manufacturing processes because they have to access the raw materials through their domestic industries. Due to lack of development of basic industries in the country, they have to import raw materials and spare parts from other countries and have to pay high duties and tariffs due to which the overall cost of product increases for them. Furthermore, the weak infrastructure and inadequate supply of energy resources also prevents them from manufacturing products cheaply. As a result, those countries which are into importing manufactured products from other countries concentrate less on Nigeria and prefer countries like China, India and Malaysia because these countries offer them innovative products at competitive rates.

The comparison of the manufacturing sector's performance of these countries also shows that the role of government is very fundamental in determining the growth and performance level of the manufacturing sectors of these countries. In China, the government

has adopted trade liberalization policies due to which investment in the sector is increasing and the sector is progressing very well as a result of the strong support of FDI. In Malaysia and India, governments have implemented several investor friendly policies due to which foreign investors are encouraged to invest in the manufacturing sector. In Malaysia, the government policies have resulted in massive rise of the foreign investments in the manufacturing sector due to which the overall performance and productivity of the sector has also improved. In Nigeria, despite the realization of liberalization, the economy and investment regime, the government enacted policies have not yet proved to be significant for the prominent increase in the manufacturing sector. As a result, the foreign direct investment flows are not coming to the country with high rates and the manufacturing sector also lacks the need of adequate investments for research and development work and technology adaptation. Moreover, the government of Nigeria has not worked out effectively for the development of adequate infrastructure and energy resources flow to the manufacturing sector that also hinders the growth of the sector. Unlike other developing countries like China, India and Malaysia, the infrastructure and energy supply in Nigeria is not effective enough to support the manufacturing activities and this factor has also contributed towards the difference in the performance of the manufacturing sectors of these countries.

The skilled labour availability and adoptability of new technology are also important factors of difference in the performance of the manufacturing sectors of these countries. In Nigeria, workers in the manufacturing sector are getting very low wage rates due to which poverty prevails in the country and the manufacturing companies cannot afford to hire qualified and skilled labour as they have less financial resources. Due to this fact, the qualification and skill development of the workers is also affected badly and the technology adaptation in the manufacturing sector also remains at a low level. In India, China and Malaysia there are different financial institutions as well as venture capital firms that work for the provision of finance to the manufacturing companies but in Nigeria the finance providers are not effectively working for the manufacturing industry due to which the sector is lagging behind other developing countries in maintaining standards and the growth level of the manufacturing sector. This may be because cost of borrowing in Nigeria has in the last 10 years reached an average level of 25% which is on of the highest in the world (CBN, 2010).

The uncertainty in the business environment is the most influential factors that acts as a barrier in Nigeria for the development of the manufacturing industry. Other developing

countries like China, India and Malaysia have sound and stable business environments due to which manufacturers are encouraged to perform well. But the situation is quite different in Nigeria where the manufacturing company owners mostly remain confused regarding taking major decisions about the future business due to which their activities are also affected and the efficiency and productivity of the manufacturing firms also decline. Whereas in China, India and Malaysia the certainty in the environments is not this high level and thus the manufacturing sector works very smoothly. Moreover, the economic structures of these countries are also important factor that change the working patterns of the manufacturing sectors. China, India and Malaysia have diversified their economies in different sectors and none of these countries are oil-based, industry-based, agriculture-based or manufacturing-based. Rather, they are concentrating upon different sectors according to the importance and capabilities of their economy. Whereas Nigeria has been an oil based economy historically and the government and other authorities have done very little towards diversification of the economy. As a result, the other sectors lack development and growth and they lag behind other developing countries.

Finally, it was revealed from the secondary analysis of data, questionnaire survey and focus group interview and the analysis of their findings that the performance of Nigeria is much weaker than the manufacturing sectors of China, India and Malaysia in terms of productivity, share in GDP, innovation, skills development, trade liberalization, input resources availability, manufacturing strategy, process, access to energy resources and environmental conditions. If Nigeria wants to follow the development patterns of these countries, then it is necessary that some major and revolutionary reforms implemented in the economy that can help to overcome the hurdles and barriers that are impeding the growth of the manufacturing sector in the country and in turn stabilizing the economy.

The comparison of Nigeria with other countries shows that there is the need to improve the performance of the Nigerian manufacturing sector substantially in order to achieve the same standard with those of Chinese, Indian and Malaysian manufacturing sectors. Firstly, it is necessary to diversify the economy towards the non-oil sectors so that there could be development of other basic industries. Nigerian government needs to take some solid steps that can work for the promotion of the basic industries in the country. When basic industries are developed in Nigeria just like in China, India and Malaysia, then Nigeria can be able to compete. Then, manufacturing companies need not have to pay high tariffs and import duties and the cost of production can be minimized. As a result, manufacturers will get the

opportunity to concentrate on other issues like research and development, technology adoptability and skills development of labour, etc. All these steps can contribute towards the development of the manufacturing sector. Thus, Nigeria has to follow the strategies of China, India and Malaysia to develop its basic industries to make raw materials easily available in order to cut down the cost of manufacturing goods in the industry.

In the same way, the government of Nigeria should also review the trade and import policies of China, India and Malaysia to utilise the applicable strategies from their policies so that the trade regime of Nigeria could also become open and favourable for investors. The local as well as the foreign investors can also be encouraged to invest into Nigeria to finance manufacturing of different products. At present, foreign investors are not attracted towards Nigeria as the trade conditions and business environment of the country does not fully support foreign investment. For example, the current multiple taxes regime which is up to 56% of declared profit does not make foreign investment attractive in the attractive (CBN, 2010). Furthermore, the difficulties in setting up business or financing the business are too much that the foreign investors prefer to go to other countries rather than Nigeria. The high rate of corruption at different levels also prevents foreign investors, and the law and order situation also acts as a barrier. Thus, the government has to assure foreign investors about the security of their money and property in Nigeria along with offering them several other incentives and investment opportunities so that the rate of FDI can be increased in Nigeria and the sector can spend on appropriate and updated technology, research and development work and restructuring of the manufacturing process.

The government should also ensure the certainty of the business environment to encourage manufacturing and other business activities. Apart from the government, the manufacturers and investors of the country should also play a part if they want to follow the development patterns of China, India and Malaysia. Manufacturers have to focus on research and development work through which they can bring innovation in their manufacturing process. They also have to make arrangements for the skill development of the workers so that a highly skilled and qualified workforce can support the innovation process within the manufacturing sector and can also work to bring new ideas into the industry. Thus, there are many differences found in the manufacturing sector's performance in Nigeria when compared to China, India and Malaysia and it is revealed from the above discussion that there are many important factors that have contributed towards creating this huge difference. The secondary analysis of data came up with much evidence that proves there

are great differences in the performance of these manufacturing sectors. The results and analysis of the questionnaire survey and focus group interview further supported the findings of the secondary research and it becomes very clear that in terms of product design, manufacturing systems (manufacturing strategy, manufacturing process and innovation), and environmental uncertainty, the Nigerian manufacturing sector is lagging behind the developing countries. Hence, the manufacturing sector is unable to support the economic development of Nigeria as the manufacturing sectors do in China, India and Malaysia. There are some very influential factors that are responsible for these differences and some major and revolutionary reforms are required to be taken by the government of Nigeria in order to follow the growth and development patterns of the manufacturing sectors of China, India and Malaysia.

6.3 ANSWERING THE RESEARCH QUESTIONS

In order to achieve the objectives of the thesis, the research focused on the following central research question: ***To what extent does product design, manufacturing systems and environmental uncertainty impacts on the performance of the Nigerian manufacturing organization?*** In order to answer this central research question the following sub-questions are answered:

1. ***What was the performance of the Nigerian manufacturing sector from 1985-2009 in terms of product design, manufacturing processes, manufacturing strategy, manufacturing innovations and environmental uncertainty?***
2. ***What are the main problems and limitations faced by Nigerian manufacturing organizations?***
3. ***What are the factors that have played an important role in undermining manufacturing sector growth in Nigeria?***
4. ***What are the main differences in terms of product design, manufacturing processes, manufacturing strategy and manufacturing innovations in the Nigerian manufacturing sector as compared with that of other countries like China, India and Malaysia?***
5. ***What are the strategies and policies that can help Nigeria to cope with the technological advancements in manufacturing?***
6. ***What strategies and planning can improve the performance and productivity of the Nigerian manufacturing organizations?***

The findings of the primary and secondary research and the interpretation and analysis of these findings enabled the examination of the Nigerian manufacturing sector over the last 25 years and the comparative analysis of the Nigerian manufacturing industry with the Chinese, Indian and Malaysian manufacturing sectors. This examination and comparative analysis helped to unfold various issues and topics related to the research study and after discussing the main issues of the research study, it now becomes possible to provide the answers to the research questions that were set out at the beginning of the research. To find the answers to these questions was the basis of this research study because these research questions are based on the main objectives of the research as well as filling the gaps found in the literature. There were six sub questions upon which the research study is based on to answer the central research question.

6.3.1 What was the performance of the Nigerian manufacturing sector from 1985-2009 in terms of product design, manufacturing processes, manufacturing strategy, manufacturing innovations and environmental uncertainty?

To do this, data and information were collected from both secondary and primary sources. The secondary research provided the history of the Nigerian manufacturing sector over the last two decades but it was found that the examination and analysis of the Nigerian manufacturing sector is not conducted by any researchers on the basis of specific performance measures like product design, manufacturing systems and environmental uncertainty. Hence, these issues were asked in detail in the statistical survey with the help of the questions formulated under different sections of the questionnaire and the opinions of the survey participants are gathered with regard to the performance of the Nigerian manufacturing sector in terms of each of the three selected performance measures. Similarly, the experts' opinion is also sought through the focus group interview, who shared their views about the performance of Nigerian manufacturing sector in terms of the selected performance measures. The performance of the Nigerian manufacturing sector with respect to the three selected performance measures has already been discussed in detail and all these three factors within the Nigerian manufacturing sector were evaluated on the basis of the survey results, experts' opinion from the focus group interview and the secondary research. In order to find the answer to this specific question, the employed research methods came up with detailed findings and analysis and it is found that the Nigerian manufacturing sector, historically being a victim of the oil-based economy, has never flourished due to the negligence of the government and authorities. The government of

Nigeria always focused on the oil sector and little attention was given to promote and encourage the activities of the manufacturing industry.

The oil price shocks in the global market also directly affected the performance of the Nigerian manufacturing sector because when the government faced massive decline in revenues from oil exports, it increased the duties and tariffs on the import of certain products and materials due to which the difficulties were further increased for the manufacturing sector. Moreover, the implementation of SAP reforms that were assisted by the IMF also resulted in increasing the prices of raw materials and spare parts in the country rather than facilitating the manufacturers of the country. Despite all these difficulties, it is also a fact that Nigeria has great potential to grow as a manufacturing country because of its geographical location. There are millions of potential consumers present in Nigeria as well as in the neighbouring countries that can be attracted by the manufacturing industry of Nigeria if it works in an efficient manner. Thus, the availability of the millions of consumers near the manufacturing unit is a great advantage that must be realized by the government as well as the manufacturers of Nigeria. They can work towards catching the attention of these consumers in the early phase and then look towards the international markets to bring more consumers and investment to the country.

The development of the manufacturing industry Nigeria is marked with many limitations, difficulties and stories of corruption and defaults. The funds and donations provided by different financial institutions, like the African Development Bank, were always inadequate for manufacturers because these funds are intercepted by the corrupt staff working at different levels of the Nigerian government. Moreover, the investment policies of the Nigerian government are still not open and supportive to investors due to which there is low foreign direct investment coming into the country and the manufacturing units also face many difficulties in managing their activities. The research study also makes it clear that improvement in the performance of the Nigerian manufacturing sector is possible only when the government and the manufacturers both show willingness and a positive attitude towards the changes required in the situation. The research study found many flaws in the decisions and policies of the government and at the same time the need to make major reforms in the manufacturers' activities is also identified in the research. Thus, the answer to this research question is achieved very successfully in the light of the findings and analysis of the secondary and primary research and this matter is discussed in detail above.

6.3.2 *What are the problems and limitations faced by Nigerian manufacturing organizations?*

The review of the literature threw light on many of the problems and limitations surrounding the manufacturing companies in Nigeria; however, this question was also asked of the participants of the survey and focus group interview so that information about the current problems faced by the people in the sector could also be gathered. The literature review and the results from survey and focus group interview identified many problems and issues limiting the performance of the Nigerian manufacturing sector and came up with common problems and limitations. It was found that the economy of Nigeria is not still diversified towards the non-oil sectors due to which little attention is given by the government to the issues faced by the manufacturing sector. The corruption prevailing within different governmental agencies and departments also hinders the growth and stability of the sector. In addition, inadequate infrastructure and energy supply to the manufacturing sector are other deficiencies that create problems for the manufacturing companies because they often face issues in having regular supply of energy and the infrastructure is also too weak to support the manufacturing activities.

Researchers revealed that another important problem faced by the manufacturing companies is the lack of financial resources because neither the local nor the foreign investors are much attracted towards the Nigerian manufacturing sector. Due to this lack of interest, less money comes into the manufacturing sector. Research and development work, labour wages, training and skill development and adoptability of technology are all badly affected due to the shortage of financial resources. Moreover, the trade regime of the country is not liberal enough to create an investor-friendly environment in the business world. The secondary analysis revealed that many of the funds and finance facilities provided by the international and regional financial institutions are highly mismanaged and hence, the funds do not reach the manufacturing sector.

Experts from the focus group interview observed that the environmental uncertainty is the key factor hindering the performance of the Nigerian manufacturing sector. They felt that developing countries are rapidly adapting to new technologies to ensure higher productivity but Nigerian manufacturing companies are still not focussing on acquiring modern machinery and they continue to stagnate with old methodologies, thereby limiting the solution for the future growth of the sector. They also identified that there is gross under utilization of resources and low capital utilization due to frequent power problems, declining demand for manufactures products and frequent strikes and lockouts by workers as well as

the employers. The experts revealed that inadequate infrastructure is also a key factor hindering the growth as it affects the flow of work in the manufacturing sector. The experts also were of the opinion that increased interference of the government in different issues relating to manufacturing industry minimized the role of private manufacturers. The experts suggested that there is great need for reforms in power sector, infrastructure including the railways, roadways and other communication systems.

All of the above mentioned problems and limitations are identified as a result of the research work and in this way the answer to this research question is also achieved successfully.

6.3.3 *What are the factors that have played an important role in undermining the manufacturing sector growth in Nigeria?*

The third research question was to find out which factors have played an important role in undermining the manufacturing sector's growth in Nigeria. This question was also asked to the participants of the survey and experts from the focus group interview. Review of many research studies highlighted the factors are having a negative effect on the performance and growth of the manufacturing sector in Nigeria. The research findings from secondary analysis, questionnaire survey and focus group interview identified common factors that are playing a major role in undermining the manufacturing sector. The secondary research revealed that high production costs caused by energy, high interest rates and exchange rates, influx of inferior and substandard products from other countries, multiplicity of taxes and levies, poor sales mainly due to poor purchasing power of consumers and delay in delivery of manufactures goods are key reasons behind the low growth and performance of the manufacturing sector. The research also revealed that the less protected companies in Nigeria should focus more towards the quality of their products through research and development work as the current level is not good enough even to see a steady growth in the performance of the manufacturing sector. The experts from the focus group listed that the corruption, negligence of government towards the manufacturing sector, inadequate infrastructure, inadequate supply of energy resources, lack of innovation and technology adoptability, low skills and qualification levels of the workforce and insufficient financial resources are the important factors that have undermined the performance and growth level of the Nigerian manufacturing sector over the last two decades.. The survey participants revealed that the Nigerian manufacturing sector is not to open to the usage and adoption of the new technologies and skills and hence, they remain stagnant and even

negatively affect the efficiency of the industry. The participants also felt that low capacity utilization and external debts is also affecting the sector's performance. The participants suggested that reforms must be applied not just in the manufacturing sector but also to other sectors associated with the manufacturing industry.

In this way, the answer to this research question is successfully arrived at with the help of the analysis and interpretation of the primary and secondary research findings.

6.3.4 Based on the literature, what are the main differences in terms of product design, manufacturing processes, manufacturing strategy and manufacturing innovations in the Nigerian manufacturing sector as compared with that of other countries like China, India and Malaysia?

The fourth question was about the main differences in terms of product design, manufacturing process, manufacturing strategy and manufacturing innovation of the Nigerian manufacturing sector as compared with China, India and Malaysia. The secondary analysis of data was conducted to review the performance of these countries to identify the main differential factors. Moreover, the experts' opinion from focus group interview was also sought for this comparison based on their working experience in countries like China, India and Malaysia. The participants of the focus group interview were asked to identify the factors, according to their opinion, that has contributed to the difference in the performance of Nigeria with other developing countries. The comparative analysis conducted among these countries in the light of the research findings further helped in getting the answer to this question. It was revealed by the experts from focus group interview that environmental uncertainty is the most important factor that is blamed for creating huge differences in the performance of the manufacturing sectors of China, India and Malaysia as compared with the manufacturing sector performance of Nigeria. It appears that most of the participants of the focus group interview and the researchers had the firm belief that the business environment of China, India and Malaysia is very supportive for their manufacturing activities. But in Nigeria, the situation is totally opposite and worse due to which the manufacturing companies get little encouragement, motivation and opportunities to progress. The social and political uncertainty works with economic instability to bring the level of the performance of the Nigerian manufacturing sector to its lowest degree in comparison with the manufacturing sectors' performance in China, India and Malaysia.

The experts revealed that China focuses on manufacturing products with innovative and advanced features, with shorter life cycles and at low prices because of which the country holds a major share in the global manufacturing industry. China has become an important and successful player in the global market because of which the economic development of the country is also increased. Participants identified that adequate investments in the research and development work is the main factor which has contributed towards the efficient performance of the Indian manufacturing sector. Adapting to new techniques and modern technology and favourable regulatory reforms were the main factors for the improvement in the Indian manufacturing sector.

In terms of the growth patterns, strategies and planning of the Nigerian manufacturing sector as compared with China, India and Malaysia, it was found that there are some very important issues that are responsible for the difference in performance level. The comparative analysis makes it clear that the contribution from the manufacturing sector in the total GDP growth of the country is very low in Nigeria as compared with the contributions of the Indian, Chinese and Malaysian manufacturing sectors. Based on this fact, it can finally be concluded that the Nigerian manufacturing sector is performing lower than the sectors of these countries. In this regard, the main reasons behind these differences were also highlighted. It was revealed that in China, India and Malaysia, the manufacturing firms have easy access to raw materials, spare parts, energy resources, financial resources and foreign investment.

The basic infrastructure in these countries is also very supportive for the manufacturing activities. For all these reasons, the manufacturing sector is performing well in these countries. Whereas, the Nigerian manufacturing sector is lacking easy access to all of these facilities due to which the firms are not able to run their activities smoothly and the efficiency and the productivity of the sector is affected. The differences found in the manufacturing sector's performance of these countries are identified and discussed in detail in the comparative analysis of the performance of these countries in the same chapter.

Moreover, when viewed in terms of the manufacturing sector's operating environment between Nigeria and countries like China, India and Malaysia, the main differences were found in the comparative analysis of the manufacturing sectors of these countries. It was revealed that the operating environment of the manufacturing industry of Nigeria is very different and non-supportive as compared with India, Malaysia and China. In Nigeria, the

government has not implemented many investor friendly policies and the manufacturing companies have to pay high tariff and import duties. Moreover, the financial resources, energy resources and infrastructure in Nigeria are also less supportive for the country's manufacturing companies. On the other hand in India, China and Malaysia, the government has formulated such policies that show the willingness of the government to improve the performance of the manufacturing industry. There are lower import and tariff duties imposed on the manufacturers and the energy flow is also smoother for these firms. The infrastructure is also adequate due to which there is a favourable environment in India, China and Malaysia for manufacturers and the manufacturing companies of Nigeria desperately lack this stability and favourable environment.

Thus, the main factors identified are highly responsible for the differences in the manufacturing sector's performance of these countries and in this way the secondary and primary research studies successfully came up with the answer for this research as well. On the basis of this comparative analysis, it was revealed that the answer to this question is also given successfully by the research study findings and analysis.

6.3.5 What are the strategies and policies that can help Nigeria to cope with the technological advancements in manufacturing?

The fifth research question was about the strategies and policies that can help the developing countries in coping with the technological advancements occurring in the manufacturing industry. This research question was based on a gap found in the literature that many of the research studies focused on the issue of technology's impact on the manufacturing sector. But none of them identified how the developing countries, especially the least developing countries, can cope with these technological advancements and their impact. Thus, the statistical survey findings were used for searching for the answer to this research question and by taking Nigeria as an example, strategies and policies were identified that could help countries to survive in the rapidly changing and highly competitive marketplace. It was revealed from the research study that the developing counties have to remain open towards the adoptability of the latest technology, which should also be appropriate for the manufacturing process and activities of that country.

The developing countries should strive to keep themselves up-to-date with the ongoing changes in the technology world so that they can make immediate changes required in their strategies and planning. For this they have to focus more and more on research and

development work so that they can be aware of the technology revolution occurring in their surroundings. Moreover the developing countries should also look towards trade liberalization measures so that FDI flow can be increased and the manufacturing companies can also take financial opportunities to invest in different fields like training and technology adaptation.

Moreover the governments of the developing countries should also focus on developing infrastructure and they should also ensure the smooth flow of energy resources to manufacturing industry. Along with that the development of the basic industries is also crucial for the developing nations because through the development of their own basic industries they can save money that they have to spend on the import of raw materials and spare parts to be used in the manufacturing process.

Experts revealed that the skills and technology usage levels in the Nigerian manufacturing sector is not satisfactory. They revealed that the Nigerian manufacturing sector is not even open towards the usage and adoption of the new technologies and skills causing stagnation as well as negative impact on the sector, mainly due to lack of financial facilities. Hence, the government should motivate and encourage investors which would help the manufacturing companies obtaining access to the finances required. Further, the participants suggested that the government and public, private and even multinational organizations should support and fund the academic research and development work by the universities and other institutions so that new technologies are discovered, tested and used.

All of these measures can help the developing countries to cope with technological advancements and in this way the research study also presented the answer to this research question.

6.3.6 What strategies and planning can improve the performance and productivity of the Nigerian manufacturing organizations?

The sixth and last research question of the study was about strategies and planning to improve the performance and productivity of the Nigerian manufacturing sector. This question was asked of the participants of the survey and mainly from the experts who participated in the focus group interview. Though the secondary research identified many steps that can help the country in improving manufacturing sector's performance, the view of the professionals operating in the sector is important as they are in a good position to understand as well as explain problems and solutions related to the industry. This research

question is intended to fulfil the research objective of coming up with suggestions and recommendations for the Nigerian manufacturing sector which the participants of the survey and focus group interview shared for the improvement of manufacturing sector's performance in Nigeria. It was found that Nigeria can liberalize its trade regime by implementing policies and strategies that can encourage investors.

In this way, foreign investment come into the country and like China, India and Malaysia; Nigeria can also enjoy the benefits of foreign investment in terms of expenditure in research and development work, skill development and technology adaptation. Moreover, Nigeria should also focus on restructuring its manufacturing strategy and process by following the manufacturing process and patterns of the developing countries so that it can manufacture products to the same standard and by spending the same amount on manufacturing. In this way, there are many policies and strategies highlighted by the results of the research study that can help Nigeria in improving the performance of the manufacturing sector to come up to the level of other developing nations like India, China and Malaysia.

Experts suggested that manufacturing companies should upgrade their research and development departments so that new technologies and new local raw materials are discovered, tested and used. They also pointed that many reforms are needed in other sectors related to manufacturing such as power, infrastructure and other communication systems so that there is a stable operating environment for the manufacturing industry. The experts also felt that there should be good management of funds and government should ensure the positive usage of these funds which can help Nigerian manufacturing industry progress and make its presence at the regional and international level. Thus, the research study also successfully provided the answer to this final research question.

The key findings from the secondary research provided details about the performance of the Nigerian manufacturing sector in the last 25 years in terms of product design, manufacturing process, manufacturing strategy, manufacturing innovation and environmental uncertainty. The analysis of the research revealed that there are no researches conducted in detail in evaluating the performance of the Nigerian manufacturing sector based on the selected performance measures. This gap identified was duly filled by the primary research in the form of questionnaire survey and also supported by the focus group interview. The results of the secondary and primary research identified mostly common problems and limitations in the Nigerian manufacturing sector. The secondary research identified many factors which

had played a major role in undermining the manufacturing growth in Nigeria. These factors were supported by the opinion of the participants of the survey and further it is substantiated by the experts from the focus group interview. The review of literature revealed that the product design, manufacturing process, manufacturing strategy and manufacturing innovation are not discussed separately and in detail by researchers. This gap is explored through the views of the experts from the focus group interview.

The primary research also prepared the background for conducting the comparative analysis of the Nigerian manufacturing sector with that of China, India and Malaysia. The respondents of the survey questionnaire expressed their views about the comparison, specifically in terms of the three selected performance measures and thus the gap in the literature is filled. The secondary research also revealed that there is enough literature about the impact of technological advancements but none of them highlighted as to how the developing countries can overcome these issues. The respondents of the questionnaire survey suggested the necessary strategies and policies for the developing countries, taking Nigeria as an example, in coping with the advancements in technology. The secondary research provided various steps that can help improve the performance of Nigerian manufacturing sector. The professionals who participated in the survey and the experts from the focus group interview provided their valuable suggestions and recommendations, complimenting the secondary research. The answers to the six sub-questions helped in answering the central research question and thus in achieving the objective of the thesis.

6.4 SUMMARY

This chapter discussed the main research findings of the secondary data analysis, questionnaire survey and focus group interview. All aspects and issues are discussed in length in this chapter to achieve the objective of this research study and present the interpretation and analysis of the research findings. The impact of measures such as product design, manufacturing process, manufacturing strategy, manufacturing innovation and environmental uncertainty on the performance of the Nigerian manufacturing sector, which is the main objective of this research, is interpreted and analyzed in detail in this chapter. Further, the other main aspect of this research which is to compare the performance of the Nigerian manufacturing sector with those of China, India and Malaysia is thoroughly analyzed in identifying the main differences.

The performance of the Nigerian manufacturing sector based on the selected measures is examined by matching the results of the secondary data analysis, statistical survey and focus group interview. Interpreting and analysing the findings of the secondary analysis, questionnaire survey and focus group interview enabled in answering the six sub-questions in this research and hence achieve the main objective of this research. The performance of the Nigerian manufacturing sector in terms of product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty in the last two decades and the main problems and limitations faced by the Nigerian manufacturing organizations were identified from the primary and secondary research findings. The factors which played an important role in undermining the growth and development of the manufacturing sector in Nigeria were identified from the secondary and research findings. The chapter highlighted the main differences in the manufacturing sectors of Nigeria and countries like China, India and Malaysia in terms of product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty. The differences between these countries are revealed mainly from the findings of secondary research and also from the opinion of the experts from the focus group interview.

The examination of the performance of the Nigerian manufacturing sector on the basis of the selected performance measures and the comparative analysis of the Nigerian manufacturing sector with those of China, India and Malaysia identified several problems and limitations responsible for the low level of performance by the manufacturing sector in Nigeria. The comparative analysis revealed that Nigerian manufacturing sector's performance is much weaker compared to those of China, India and Malaysia in terms of productivity, contribution towards GDP, innovations, development of skills, trade liberalization and resource availability. The chapter also presented the possible strategies and policies that can help Nigeria to cope with the technological advancements in the manufacturing sector based on the findings from the secondary and primary research.

Further, the strategies and policies to improve the performance and productivity of the Nigerian manufacturing organizations, suggested by the participants of the survey as well as the focus group interview, are also presented in this chapter. The participants of the questionnaire survey and the experts from the focus group interview suggested that Nigerian manufacturing companies should follow the patterns and strategies of the developing countries like China, India and Malaysia for improving the performance of the manufacturing sector. The participants and the experts also suggested that the Nigerian government should

take major steps in restructuring and reforming the manufacturing systems. Most importantly, they stressed the need for diversification and liberalisation of the Nigerian economy to improve the performance of the manufacturing sector.

Examining the results of the secondary data revealed there were certain gaps in the literature. The in-depth analysis of the selected performance measures – product design, manufacturing processes, manufacturing strategy, manufacturing innovation and environmental uncertainty – through the questionnaire survey duly covered the gap as this analysis was missing in the secondary research. Moreover, the comparative analysis of the Nigerian manufacturing sector with those of developing countries like China, India and Malaysia was missing in the literature and the gap is filled by the experts' opinion from the focus group interview. All the research questions are explained in detail and well presented in this chapter and thus the research study successfully provided the answers to all the sub questions of the research study. Hence, it can be concluded that by answering the six sub questions, the research study duly answered the central research as well.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

7.1 INTRODUCTION

This chapter is aimed at concluding and summarizing all the activities and work that was done for the research study. In this regard, this chapter presents a detailed summary of the entire research study with respect to both the primary and the secondary research and also put forward some workable recommendations that are meant for the Nigerian government and the companies operating in the Nigerian manufacturing organizations with the objective of bringing some positive changes and an improvement in the position and performance of the sector. These recommendations are also presented because it is one of the key objectives of the research to formulate some suggestions that can work for the improvement of the performance of the Nigerian manufacturing sector and the research study outcomes can attempt to contribute towards an improvement in the situation. Moreover the chapter also describes the problems that were faced whilst conducting the research study and also highlights some of the areas where there is need of further research work.

7.2 RESEARCH SUMMARY

The research study was based on the key objective of examining the performance of the Nigerian manufacturing sector over the last 25 years and in this regard there are three performance measures selected: product design, manufacturing systems (manufacturing strategy, manufacturing process and innovation) and environmental uncertainty so that the evaluation and examination could be done on the basis of these factors. Moreover, the research study also compared the performance of the Nigerian manufacturing sector with that of some developing countries like India, China and Malaysia so that Nigeria could also strive to follow the development and growth pattern of these countries by following and adopting the strategies and planning of these countries that are applicable in the conditions prevailing in Nigeria. Furthermore, the research study also worked for the identification of the major problems and limitations surrounding the manufacturing sector so that some workable recommendations could be formulated which may result in some improvements in the current situation. The main motive behind conducting the entire research work was not just to contribute to the literature but also to make a positive move towards the

improvement of the situation of the Nigerian manufacturing sector through the attainment of the key objectives of the research.

In order to achieve these objectives, there was a mixed methodological approach employed and data and information for the research work collected through different primary and secondary resources. First of all it was decided that the main purpose of the research was to explain and explore the issues related to the topic of the research so the research study is "exploratory" as well as "explanatory" and strived to explain the past and present of the Nigerian manufacturing sector as well as identified the main problems and limitations it faces. Moreover, the research also explored different strategies and paths that could lead the country towards the position where the manufacturing sector can be strong enough to support economic growth.

In addition to this, the process of the research was also decided while constructing the main research design and it was found that the mixed methodological approach was an appropriate and significant method of conducting the research study. So there were both qualitative and the quantitative research methodologies employed in the research and the data and information was collected through both of these types of methods. In this regard the "secondary analysis of data" was selected as the qualitative research methods and different secondary sources like books, journals, magazines, research reports and informative web portals were accessed to collect the related literature conducted around the topic. Alongside that a "statistical survey" was conducted among 400 companies operating in the Nigerian manufacturing sector as the quantitative research method and with the help of a structured questionnaire the opinions of professionals regarding different aspects of the issue were collected and analyzed to obtain the answers to the research questions and to achieve the key objectives of the research study. Further, to compliment the secondary data analysis and the survey questionnaire, a focus group interview was conducted with 10 experts selected from the manufacturing organizations, universities, research institutions and manufacturing consultants. The focus group interview helped to collect qualitative data for the research to plug in the uncertainty and gaps caused by the secondary data analysis and the survey questionnaire. At the same time, it was also decided that the expected outcome of the research would be applied in nature because the results of the research study was in the form of some workable suggestions for the Nigerian manufacturing sector and it identified the strategies of the developing countries that are applicable to the Nigerian manufacturing sector as well.

Three major matters were decided before starting the research work; the survey sampling was also done along with setting the criterion for the selection of the survey respondents. It was decided to contact the manufacturing firms involved in the manufacturing of consumer goods in Nigeria because the research work involved manufacturing of consumer products. A list of 400 firms was drawn from the Nigerian manufacturing directorate based on the criterion that there were more than 50 employees in the firm and the CEO, head of the operations departments or the Manager of the firm was available to respond to the survey questionnaire. The country was divided into three zones and according to the number of the manufacturing companies located in each zone questionnaires were sent to the selected companies. Most manufacturing firms were located in Lagos so more firms from this area participated in the survey.

The questionnaire was constructed using the Likert scale where the respondents were given five options (very high, high, medium, low and very low) to rate the given statement. As the main objective of the research was to analyze and compare the performance of the Nigerian manufacturing sector on the basis of three performance measures, the questionnaire of the survey was also constructed keeping in view this requirement and there are different sections in the questionnaire; each of them focused on a single feature of the manufacturing industry. Moreover a section was also included for conducting the comparative analysis of the Nigerian manufacturing sector with the developing countries and in the end one section with open- and closed-ended questions was included to have an overall understanding of the positions and performance of the Nigerian manufacturing sector in the view of the professionals operating in the field.

The survey was conducted with the objective of collecting practical evidence from the business world about the performance and position of the Nigerian manufacturing sector. Finally questionnaires were sent to the selected companies and after 3 months there were a total of 120 responses collected. The results for each of the questions were calculated separately and then for each section to obtain an overview of the entire situation.

The participants for the focus group interview were selected based on their knowledge academic background and work experience which included their exposure in terms of number of years in the manufacturing sector and in various regions of Nigeria and also their experience of working in other countries, particularly China, India and Malaysia. A list of 30 people was compiled from the directorate of manufacturing enterprises and a series of

screening was done to short list 10 participants for the focus group interview. The experience of the participants ranged from 25 to 40 years in various industries in the manufacturing sector in Nigeria and other countries and some of them with teaching experience related to manufacturing in Nigerian universities.

A questionnaire was constructed for the interview with 15 open-ended questions which aimed at probing the role of product design, manufacturing processes, manufacturing strategy, manufacturing innovations and environmental uncertainty in the performance of the Nigerian manufacturing sector. The questions also covered areas such as factors that affect the growth of manufacturing sector in Nigeria, the sector's contribution to the growth and development of the country and comparison between the performances of the Nigerian manufacturing sector with that of the Chinese, Indian and Malaysian manufacturing sectors. The results of the focus group interview were compared with each other to have a clear understanding of the performance of the Nigerian manufacturing sector.

The findings of the secondary and primary research were then compiled. It appeared that many of the issues and topics of the thesis had became very clear in the light of the secondary analysis of data and the rest of the issues were explored with the help of the survey results. For example the secondary analysis of data provided detailed explanation and understanding of how the manufacturing industry was emerging in a new industry due to the advent of technology that had brought many revolutionary changes in the field. Moreover the importance and contribution of the three performance measures selected for the study was also explained in the review of the literature.

Along with that the secondary research also presented an overview of the past and present performance of the Nigerian manufacturing sector and identified the major problems and limitations hindering the growth and development of the sector. The performance of the manufacturing sectors of India, Malaysia and China were also presented with the objective of collecting information for conducting a comparative analysis of these sectors. As a result of the secondary research, some gaps were found in the literature and on the basis of these gaps some of the research questions were also formulated in the statistical survey and focus group interviews questionnaire, so that these identified gaps can be filled as a result of this research study.

The results of the statistical survey provided detailed understanding of how the manufacturing industry professionals view the performance of the Nigerian manufacturing

sector with regard to product design, manufacturing systems (manufacturing strategy, manufacturing process and innovation) and environmental uncertainty. The main problems and limitations of the sector in the eyes of the people operating in the field also became clear as well as the methods and policies that they thought can help in overcoming these problems and limitations. Thus, the issues that remained unfolded in the secondary research were explored in the statistical survey results and focus group interview and their analysis and all the matters became clear as a result of the analysis of the secondary and primary research findings.

The analysis and interpretation of the secondary and primary research allowed searching for the answer to the research questions formulated in the light of the main objectives of the research. The comparative analysis of the Nigerian manufacturing sector with the developing countries' manufacturing sector was also conducted with the help of data and information collected from secondary and primary research, mainly from the responses of the experts and professionals in the focus group interview. It was revealed from the research that the examination of the Nigerian manufacturing sector in terms of three performance measures was done successfully along with the comparative analysis with the help of data and information gathered through survey results and secondary sources. It was revealed that the oil-based economy of Nigeria hinders the development of the basic industries and the manufacturing sector in the country due to which there was great need of diversification of the economy towards the non-oil sectors. It was also found that the Nigerian manufacturing sector was contributing little to the total GDP of the country; especially in comparison with the developing countries. Due to this fact the economy of Nigeria is not getting support from the manufacturing industry and most of the population is compelled to live below the poverty line in Nigeria.

There were a number of factors identified, like non-diversification of the economy, inadequate supply of energy resources to the manufacturing industry, lack of easy availability of raw materials, high cost of production, lack of research and development work, low adoptability of the latest technology, the low skills and qualifications level of the workforce, low wages and incentives for the workers in the manufacturing sector, corruption, unfavourable market conditions, a non-attractive business scene for foreign investors and high tariffs and import duties for certain products, raw material and spare parts. At the same time it was found that Nigeria is a potential market for millions of consumers and it can benefit significantly if there is improvement in the overall situation of

the manufacturing industry. The role and polices of the government play a vital role in determining the performance of the manufacturing sector and the manufacturing companies are also required to revolutionize their patterns of working to align with the latest technology.

It was revealed from the research study that product design in the Nigerian manufacturing sector is not rated as high, especially when compared with the developing countries where it was found that Nigeria has a very low level of product design and there was also lack of innovation in manufacturing of consumer goods because there is little emphasis on the adoptability of the latest technology. The major reasons behind lack of technology adoptability is the difficulty in securing finance from different resources due to which there is little research and development work done in Nigeria in the field of manufacturing and the workers are also not skilled enough to adopt the modern technology and techniques of production.

As compared with the performance of the Indian, Chinese and Malaysian manufacturing sector the uncertainty in the Nigerian business environment appeared to be an important and most influential factor that has led towards the creation of huge difference in the performance of these sectors. Moreover the trade liberalization polices and favourable investment conditions and opportunities in the developing countries are allowing them to foster the growth of their manufacturing sector but in Nigeria the foreign investors find little opportunity and encouragement due to which the level of FDI coming into the Nigerian manufacturing sector is very low. In addition to this the local finance institutions do not provide sufficient finance to the manufacturing firms due to which the sector is unable to progress well.

It was also revealed from the analysis of the research findings that there is little contradiction in the findings of the secondary and the primary research; the opinions of the researchers and the professionals working in the field are similar to a great extent. This fact gave an assurance that the evidence collected from the business world can be placed well with the secondary research findings in order to obtain an overview of the situation.

Thus in the light of the above research findings and the identification of the major problems, there were some suggestions and recommendations formulated for the Nigerian manufacturing sector that can work to make some positive changes in the situation. These recommendations are presented in the following sections.

7.3 RECOMMENDATIONS FOR THE NIGERIAN GOVERNMENT AND MANUFACTURING ORGANISATIONS

The research study aimed at putting forward some recommendations for the Nigerian manufacturing sector that are expected to make the situation of the sector better and more supportive for economic growth. These suggestions and recommendations were drawn from three sources: the opinions of the survey participants who were all high level officials working in the manufacturing industry of Nigeria, the comparative analysis of the Nigerian manufacturing sector with developing countries as this comparison allowed examination of certain strategies that could lead towards better performance of this manufacturing sector.

While formulating the recommendations and suggestions for the Nigerian manufacturing sector it was observed that there are two main players in the entire situation: the government and the manufacturing firms. If there is an intention to bring improvement in the overall conditions of the Nigerian manufacturing sector then it is necessary that most of these players must make revolutionary changes in their policies, activities and strategies because the cooperation and positive attitude of both can improve the situation and the government or the manufacturing companies alone cannot do anything for the sector. Thus the recommendations and suggestions are also meant for the government and the companies operating in the Nigerian manufacturing sector and these are as follows:

7.3.1 SUGGESTIONS FOR THE NIGERIAN GOVERNMENT

The research study has shown that the role of the Nigerian government has played a very important and unfortunately non-supportive role for the Nigerian manufacturing sector. There are many factors that were identified by the researchers and the survey participants that act as barrier to the growth of the Nigerian manufacturing sector and the government of Nigeria has the authority and power to remove these barriers to ensure the growth and development of the manufacturing industry in the country. In this regard there are some very important issues upon which the government of Nigeria has to focus and formulate strategies to make revolutionary changes in the following perspectives.

7.3.1.1 Diversification of the Economy

An important and fundamental suggestion that was given by many of the researchers is to diversify the economy of Nigeria towards the non-oil sector. Nigeria is among the major producers as well as exporters of crude oil but despite this the economy of the country is at a very low level due to the mismanagement of resources and corruption, etc. The

fluctuations in the oil prices in the global market further work to destabilize the economy but despite all these facts the government of country ignored the non-oil sectors and as a result the country is listed among the poorest nations of the world. Now there are some signs that show that the government has realized the importance of diversifying the economy; it is necessary for the government to pay attention towards the non-oil sector so that other industries can grow as well, and in this regard the government should make investments in non-oil sectors to support their development. Thus it is suggested that the diversification of the economy towards the non-oil sector would be the most significant and positive step towards the development and improvement in the growth level of manufacturing industry in Nigeria.

The comparison of the Nigerian manufacturing sector with the developing countries also shows that in these countries the governments pay attention to different industries so that all of the sectors can grow and support the economy. So, Nigeria should also follow this strategy and work for the diversification of the economy towards the non-oil sectors. It will not only improve the situation of manufacturing industry but there will be an improvement in the overall economic conditions of the country as well.

7.3.1.2 Trade Liberalization:

The trade regime of Nigeria at present is not regarded as favourable for investors. The country has not implemented the trade liberalization measures in a true sense and until now there has been a ban on the import of certain items; duties and tariffs rates are also very high. Due to these problems foreign investors are not encouraged to come invest in different Nigerian industries. Thus the government has to make this situation better. There must be an open policy adopted by the government of Nigeria like China that allows easy access for foreign investors to the domestic markets and industries of the country due to which more FDI came in the country and different sectors started flourishing in China. The Nigeria government must work to encourage foreign investors by showing them different investment opportunities in the country and by facilitating and encouraging them through different incentives and flexibilities in business operations. Thus it is concluded that the government of Nigeria must work for the liberalization of the economy; only then can the manufacturing sector grow like in other developing nations.

7.3.1.3 Development of Basic Industries

One important barrier to manufacturing industry growth identified in the secondary and primary research was the non-availability of raw materials and spare parts at a local level, due to which the manufacturing companies have to import these items and pay high import duties. Ultimately, the cost of products rises and manufacturing companies fail to remain cost effective. The development of basic industries in Nigeria can allow the manufacturers to get raw materials and spare parts from inside the country and a considerable amount of money will be saved that they can put to positive use, such as for research and development and skills development. China, India and Malaysia can also be examples for Nigeria, in that these countries have access to raw materials and spare parts through their domestic industries and that is why they manufacture products with high standards and at low cost that allows them to export products to other countries along with meeting the demands of their own consumers. Thus the Nigerian government has to follow the strategy of the developing countries and should concentrate on the development and promotion of the basic industries in the country.

7.3.1.4 Improvement of Infrastructure

The infrastructure plays an important role in determining the successful operations of the manufacturing industry because the telecommunication and transportation network is essential for manufacturing industry-related activities. The research studies and the survey participants expressed that the Nigerian manufacturing sector is also facing problems due to the fact that the infrastructure of the country is not developed enough to support manufacturing activities. In this regard the government has the authority to take decisions regarding the development of the infrastructure of the country and in order to improve the conditions of the manufacturing sector it is necessary that the government should spend adequate money on the development of infrastructure.

7.3.1.5 Adequate Supply of Energy to the Manufacturing Organizations

The previous research studies, the field survey and the group focus interview all showed the difficulty that the manufacturing companies in Nigeria often face problems in getting adequate supply of energy resources due to which the activities and operations of the manufacturing industry are badly affected. The proper flow of energy resources to the manufacturing industry should also be assured by the government. Some of the experts also believe that the oil companies also have to play a role in the situation so the government should ask the oil companies to participate in the work of arranging proper energy supply to

the manufacturing industry. The energy supply is a must for manufacturing firms and in the absence or improper supply of these resources the productivity and efficiency of the manufacturing firms is badly affected – in the case of Nigeria this is the situation. Thus the government is required to take major and solid steps to ensure the proper supply of energy resources to manufacturing companies so that they can work at full efficiency.

7.3.1.6 Finance Providers

The Nigerian manufacturing sector also strongly feels the need for appropriate finance provision. At present banks and other financial institutions provide loans to manufacturing firms at very high rates (put at an average of 23% for the year 2010) and in difficult conditions due to which the manufacturing firms get little finance from the banks and institutions. The local investors at the same time are also less interested in investing in the manufacturing sector because they see little scope for getting a high return on their investment. In this regard, the government has to make some arrangements and should establish special banks or financial institutions that can grant loans to the manufacturing companies on easy terms and conditions and the manufacturers can then carry on with different activities in an efficient manner after getting sufficient finance from the banks or institutions especially meant for the manufacturing industry. The government also has to assure through a check and balance system that there will be no corruption in matters of giving finance to the manufacturing firms and all the funds and loans given by regional and international financial institutions will also be handed over to the manufacturing industry with complete honesty and fairness so that the sector can reap the benefits from the aid and can progress.

7.3.1.7 Investors Friendly Environment:

The investment in the Nigerian manufacturing sector is very low due to which there is lack of research and development work; at the same time companies are not able to cope with the changes occurring in the technology world. This is one of the major causes of low level performance of the Nigerian manufacturing sector. Investors are not encouraged to invest in Nigeria due to many factors like the law and order situation, complications of business procedures and lack of technical adoptability in the manufacturing sector. The government can play a significant role in this regard and can encourage foreign investors to invest in the manufacturing sector of the country by simplifying business procedures and providing several incentives to them.

The flow of FDI can bring many positive changes in the manufacturing sector of the country so the government of Nigeria has to take some solid steps to attract foreign investors. In this regard the functioning of the government agencies and departments is also very important. Organisations like NIPC should also work more effectively to attract foreign investment to the country by assisting and facilitating foreign investors. Thus the government has to work to make such departments and agencies more efficient by lowering the level of bureaucratic control over these agencies so that they can work fairly and efficiently to attract foreign investments. The example of developing countries like China, India and Malaysia also show that in these countries foreign investors are provided with an investor friendly environment due to which the level of FDI increases in these countries and the manufacturing sector also gets support from this investment to become better and productive.

7.3.1.8 Certainty in the Business Environment:

The comparative analysis of the Nigerian manufacturing sector with the sectors of India, Malaysia and China has clearly indicated that the certainty in the business environment of Nigeria is the strongest factor that has contributed to the high level of difference in the performance of these sectors. The researchers have also observed that the socio-political situation in Nigeria is very uncertain, due to which business activities are also badly affected. In this regard the government has to make sure through its reforms and strategies that there will be stability in the business environment that can allow businessmen to take decisions with full confidence. The stability of the business environment in China, India and Malaysia is a powerful motive for business people to become efficient and productive and the manufacturing industry of these countries progresses well after getting the support of a stable environment. Just like these countries, Nigeria also needs a stable business environment where the manufacturing companies can freely work to enhance the productivity and efficiency of their business.

7.3.2 RECOMMENDATIONS FOR THE MANUFACTURING ORGANIZATIONS

Along with the government, the manufacturing companies of Nigeria can also play a very important role in determining the high performance of the manufacturing sector. This shows why it is important that the operators of these companies look towards the issues that are creating problems in the sector and work for the resolution of these issues with all their capabilities. Thus there are also some recommendations for the manufacturing companies' operators, so that they can also realize that they can also make a difference in the situation

by paying attention to certain important issues. The following issues require the attention of the manufacturing companies' owners:

7.3.2.1 Research and Development Work:

The manufacturing sector in Nigeria essentially requires research and development work because the current manufacturing process and strategies adopted by the manufacturing companies are not at international level due to which Nigeria has failed to be competitive. In this regard it is necessary that the manufacturing sector must conduct adequate research and development work so that they can be aware of the new technologies and techniques of manufacturing that can raise the quality and standard of their products and at the same time allow them to reduce the cost of production of their manufactured goods. However at present the manufacturing companies are not focusing much on research and development work due to which the level of innovation within product design and the manufacturing process adopted by these companies is also very low. In this regard it is very important and recommended to the manufacturing companies of Nigeria that they make arrangements for research and development work so that their current manufacturing process can be updated according to the requirements of the latest technologies and at the same time they can also learn several new ways of lowering the cost of manufacturing.

The manufacturing companies can go for collaboration with the companies of other countries as the technology enables them to access people in different parts of the world, so they must arrange for common research and workshops with some of the manufacturing companies of the developing nations so that they can reap the benefits from research and development work done by these companies. They can also secure help from the government resources and in case of a non-cooperative attitude of the government agencies, they can work through joint forums and business organisations to share their research work and to make arrangements for conducting further research work in the field of manufacturing. In the end the manufacturing companies will benefit in terms of innovation and technology adaptation in the sector that will add to the revenue and popularity of their products.

7.3.2.2 Technology Adoptability

Manufacturing sectors all over the world are going through phases of revolutionary changes as they strive to keep themselves aligned with the changes occurring in their surroundings. This alignment helps to be competitive as well as cost effective at domestic, regional and

international level, however in the case of Nigeria it is observed that manufacturing firms are not paying attention to technology adoptability and they are manufacturing products with their traditional process and techniques. As a result the cost and time of production is still high in the sector and the manufactured products are generally not at international level. In order to remove this major flaw from the manufacturing process of the Nigerian manufacturers, the main responsibility lies upon the shoulders of the manufacturing companies' owners, managers, CEOs and other authorities who must implement the appropriate technological changes to restructure their manufacturing process.

In this regard they have to review the manufacturing processes adopted by the consumer goods manufacturers of the developing countries so that they can follow the same working patterns after making necessary changes according to their own capabilities and then come up with up-to-date designs for the products that will be given physical form after going through the advanced manufacturing process. The negligence of the modern and advanced technology is not affordable for the manufacturing sectors in the present day and if Nigerian manufacturing sector operators want to assure their survival in the highly competitive and technology-driven market place of today then they have to make arrangements for the adaptation of technology within their manufacturing activities and operations.

7.3.2.3 Skill Development and Training of the Workers

The research study revealed that in the Nigerian manufacturing sector there is little emphasis given to the skills development and training of the workforce. This is also an important reason for the trend of innovation and technology adoptability being very low in the sector. In this regard the owners and the decision making personnel working in the Nigerian manufacturing sector must make some arrangements for the training and skills development of their workers. In this regard the manufacturing companies should arrange workshops and training for their employees within the country as well as abroad. When the workers go to other countries for training, they pick up new skills and on their return they can apply these changes in their own manufacturing sector and in this way change can be brought to the sector with the help of training s and workshops. Moreover the manufacturing sectors can also hire the services of professionals working in the manufacturing sectors of the developed countries to come and show the workforce in Nigeria about the working patterns of the sector in which they work. This way can also bring some innovation and new ideas in the Nigerian manufacturing sector.

7.3.2.4 Pay Scales and Incentives for the Workforce

The present pay scales and incentives given to the workforce of Nigeria are not significant enough to motivate the workers, so the Nigerian manufacturing companies must revise the pay scales of the workforce and should also give some incentives and facilities to the workers so that they can be motivated to work for improvement in the performance of the sector. At the same time good salaries and incentives will compel the workers to perform well and to adopt new techniques and methods of manufacturing in their companies. Thus increments in the pay scales of the workers and incentives can also work for the betterment of the situation and the operators of the Nigerian manufacturing sector should also concentrate on this issue.

7.3.2.5 Restructuring the Manufacturing Process and Strategy

It was revealed from the results of the primary and secondary research that the manufacturing strategies and manufacturing processes followed by the manufacturing sector are not at international level and there is an essential requirement for updating the system and strategy. In this regard the supervisors and authorities of the manufacturing industry are required to adopt and follow the manufacturing system and manufacturing process in accordance with the requirements of the modern system and for this they are required to do research and development work, technology adoptability as well as to focus on the training and skills development of their workers.

7.3.2.6 Focusing on Quality and Cost Reduction Measures

The quality and standard of the manufactured products is the most important attribute that assures the success and popularity of the products. At the same time the price of the product should also be kept at the lowest possible level to attract more consumers and countries towards the product. In the Nigerian manufacturing sector the cost of production is very high in the manufacturing sector because of the importing of raw materials and spare parts. The manufacturing companies should look towards other ways that can help them in reducing the cost of manufacturing the products and for this they can get help from the research and development work.

7.4 LIMITATIONS OF THE RESEARCH

The key objectives of the research study were achieved through the employment of a mixed methodology research approach; however there were some limitations and problems during the research study. First of all there were little authentic data available related to the

manufacturing sector growth and development in Nigeria, due to which the research study had to rely upon the research conducted by different researchers and these research studies mostly described the facts rather than providing much in the way of figures and statistical data. As a result, mostly theoretical information is provided in the thesis about the manufacturing industry of Nigeria and little statistical data is found from any authentic source. However apart from the statistical data there was sufficient information found related to the performance of the Nigerian manufacturing sector over the last decades so the examination and analysis of performance was carried out successfully.

In addition to this, there were problems faced in collecting responses from the CEOs and other personnel of the manufacturing firms of Nigeria. There was an agreed time of three months for the collection of the questionnaires but during that time not all the questionnaires were returned. 254 out of 400 responses were finally calculated for the survey. The questionnaire was too long, so many of the personnel showed their unwillingness to fill them out due to a shortage of time and their engagements in some important matters. But the questionnaire could not be cut down because there was an intention to get detailed opinions of the respondents regarding different issues related to the topic of the thesis and for the attainment of this objective there were different sections made in the questionnaire and there were 7-8 questions in each of the seven sections, which made the questionnaire very long. However, the questionnaire could not be made shorter as per the requirement of the research study and only the completely filled out questionnaires received are included in the research for the calculation of the survey results. Thus, these were the two major limitations that were faced while conducting the research work as it was found that there was a lack of statistical data related to the manufacturing sector. Some of the personnel working in the industry also responded unfavourably on the issues of time shortage and the long questionnaire constructed for the survey.

7.5 AREAS OF FURTHER RESEARCH

The research study conducted an examination of the Nigerian manufacturing sector in detail with the help of three performance measures, a historical perspective and comparative analysis; however there are some very important areas that still need adequate research work so that the Nigerian manufacturing sector can be further benefited. In this regard it is very important that along with keeping in mind all the limitations and problems of the Nigerian manufacturing sector, the researchers should look towards the methods and techniques that can help the Nigerian manufacturing companies in reducing their cost of

manufacturing products and while having the same financial resources they can also go for the advanced techniques and methods of manufacturing.

In order to follow the paths of the developing nations and to adopt technology, maintain high quality and conduct research and development work, it is necessary that there must be sufficient financial resources, which the sector currently lacks. Thus the researchers have to search for the methods that can help the manufacturing sector with the same, limited financial resources. Moreover they also have to work towards creating realization among the authorities to take some steps for the improvement of the situation and this could be done by gaining access to senior personnel and negotiating with them about the problems and solutions encountered by the manufacturing sector in Nigeria. This may be achieved through a longitudinal study of costs of manufacturing in Nigerian manufacturing sector along with comparison with other countries that successfully managed costs in their manufacturing sector.

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APPENDICES

Appendix A

Group by Group Classification of Manufacturing Companies in Nigeria

S/N	Group	Sub-groups
1	Food, beverages & tobacco	17
2	Chemical and pharmaceuticals	16
3	Domestic and industrial plastic and rubber	3
4	Basic metal, iron and steel and fabricated metal products	10
5	Pulp paper and paper products, printing and publishing	4
6	Electrical and electronics	5
7	Textiles, wearing apparel, carpet, leather/leather footwear.	5
8	Wood and wood products including furniture	2
9	Non-metallic mineral products	5
10	Motor vehicle and miscellaneous assembly	8
	Total sub-sectors	70

Source: Manufacturers Association of Nigeria (MAN) 2008.

Appendix B

Classification of Manufacturing Companies in Nigeria

in Terms of Sub-Sectors

GROUP	S/N	SUB-GROUP
FOOD, BEVERAGES & TOBACCO		
	1	Beer
	2	Starch and other Miscellaneous Food Products
	3	Flavouring
	4	Soft Drinks and Carbonated Water
	5	'Flour and Grain Milling
	6	Meat and fish
	7	Tea, Coffee and other Beverages

	8	Dairy Products
	9	Fruit Juices
	10	Tobacco
	11	Biscuits and Bakery Products
	12	Animal Feeds
	13	Poultry
	14	Sugar
	15	Distillery and Blending of Spirit
	16	Cocoa, Chocolate and Sugar Confectionery
	17	vegetable & Edible Oil
CHEMICAL AND PHARMACEUTICALS	S/N	SUB-GROUP
	1	Paints, Vanishes and Allied Products
	2	Industries, Medical and Special Gasses
	3	Soap and Detergent
	4	Agro-Chemicals (Fertilizers and Pesticides)
	5	Pharmaceutical
	6	Resin Manufacturers
	7	Safety Matches
	8	Domestic Insecticide and Aerosol
	9	Dry Cell Battery
	10	Petroleum Refineries
	11	Gramophone Records and and Musical Tapes Manufacturers
	12	Candle Manufacturers
	13	Printing Ink Manufacturers
	14	Toiletries and cosmetics Ball Point Pen Manufacturers
	15	Basic industrial chemicals
	16	Automotive battery
DOMESTIC AND INDUSTRIAL	S/N	SUB-SECTORS

PLASTIC AND RUBBER		
	1	Rubber products
	2	Domestic and industrial plastics
	3	Foam manufacturers
BASIC METAL, IRON AND STEEL AND FABRICATED METAL PRODUCTS	S/N	SUB-SECTORS
	1	Association of steel pipe manufacturers
	2	Metal Packaging ! Manufacturers
	3	Foundry
	4	Metal manufacturers and fabricators
	5	Primary Aluminum products
	6	Enamel Wares {Manufacturers
	7	Welding Electrode manufacturers
	8	Galvanized Iron Sheets Manufacturers
	9	Nail and Wire Manufacturers {Group
	10	Steel {Manufacturers
PULP PAPER & PAPER PRODUCTS, PRINTING & PUBLISHING	S/N	SUB-SECTORS
	1	Chemical & stationery manufacturers
	2	Printing publishing and packaging
	3	Pulp. Paper and paper products
	4	Sanitary Towels and Diapers manufacturers
ELECTRICAL & ELECTRONICS	S/N	SUB-SECTORS
	1	Electronics
	2	Refrigerators & Air conditioning/Domestic Appliances

	3	Electric Bulb lamps, Accessories & Fittings
	4	Electrical power control & Distribution Equipment
	5	Cable and Wire
TEXTILE WEARING APPAREL, CARPET, LEATHER/ LEATHER FOOTWEAR	S/N	SUB-SECTORS
	1	Textile & Wearing Apparel manufacturers
	2	Leather products manufacturers
	3	Carpet and rug Manufacturers
	4	Footwear manufacturers
	5	Cordage, rope and Twine manufacturers
WOOD AND WOOD PRODUCTS INCLUDING FURNITURE	S/N	SUB-SECTORS
	1	Wood Products and Furniture (Excluding metal furniture)
	2	Plywood & particle Board manufacturers
NON-METALLIC MINERAL PRODUCTS	S/N	SUB-SECTORS
	1	Glass manufactures
	2	Ceramics manufactures
	3	Asbestos manufactures
	4	School chalks and crayons
	5	Cement manufacturers
MOTOR VEHICLE & MISCELLANEOUS ASSEMBLY	S/N	SUB-SECTORS

	1	Boat/Ship Building
	2	Automobile components manufactures
	3	Electric generators assemblers
	4	Miscellaneous machine & equipment manufactures
	5	Bicycle manufactures
	6	Motorcycle assemblers
	7	Horological
	8	Motor vehicle assemblers

Source: Manufacturers Association of Nigeria (MAN) 2008.

APPENDIX - C

SURVEY QUESTIONNAIRE

This questionnaire should be completed by the key individual who is the most influential person in the manufacturing aspects of the enterprise. He or she could be the CEO or Head of Manufacturing Operations. The results will be used for academic research purposes only. Your individual confidentiality will be strictly maintained. None of the data and published documents resulting from this study will make reference to you or your enterprise. We appreciate your co-operation.

CODE NUMBER [ ] [ ] [ ] [ ] [ ]

Section I (Optional Section)– Information about Respondent and Company

Contact Name and Designation	
Company Name	
Address:	
Phone Number:	
City:	
State:	
E-mail:	
Fax:	
Web Address of Company:	

Section II – Opinions about Product Design

(1= Very High, 2= High, 3= Medium, 4= Low, 5= Very low)

Statement	Rating
Q1. How do you evaluate the skills and technical capabilities of Nigerian labour in the perspective of maintaining high level of product design and quality of the products produced in the Nigerian manufacturing sector?	1 2 3 4 5
Q2. What is the level of Nigerian companies' contribution to product design? i.e. To what extent do you rate the performance of the Nigerian manufacturing sector in terms	1 2 3 4 5

of high productivity and revenues?	
Q3. How would you compare the products designed by Nigerian consumer goods manufacturing companies' in terms of quality with similar products of international companies?	1 2 3 4 5
Q4. How do you rate consumer sector product designers of Nigeria with regards to the potential to generate unique and competitive ideas and concepts for the product designing?	1 2 3 4 5
Q5. What is the trend among the Nigerian manufacturing companies in carrying out adequate research to determine the demands and expectations of the consumers before they go into product design process?	1 2 3 4 5
Q6. How do you see the present product designs practice of Nigerian consumer goods in assisting the country to compete at domestic and global level?	1 2 3 4 5
Q7. To what extent does the present product design of consumer goods in Nigeria successfully meet the expectations and demands of the Nigerian consumers?	1 2 3 4 5

Section III – Information about Manufacturing Process followed in the Nigerian manufacturing sector

(1= Very High, 2= High, 3= Medium, 4= Low, 5= Very low)

Statement	Rating
Q8. To what level do you think that Nigerian government policies including structural adjustment programmes (SAP) induced high cost of imported machinery and raw materials in terms of growth and productivity in Nigerian Manufacturing firms?	1 2 3 4 5
Q9. To what extent do you see the need for training and skill development programmes for workers of Nigerian manufacturing companies to enable them adopt high level manufacturing process?	1 2 3 4 5
Q10. To what level are Nigerian Manufacturing companies	1 2 3 4 5

adopting new machinery and methodology within their manufacturing processes?	
Q11. To what level is the Nigerian Manufacturing sector well-equipped with the skills needed to adopt international modern manufacturing processes?	1 2 3 4 5
Q12. To what extent is the need to restructure the manufacturing process of Nigerian firms towards focusing on remanufacturing?	1 2 3 4 5
Q13. To what level is the technical know-how and machinery availability affecting the performance of the Nigerian manufacturing companies?	1 2 3 4 5
Q14. To what level do you think the Nigerian manufacturing firms should focus on the issues of chain, lean and agile manufacturing concepts?	1 2 3 4 5

Section IV – Information about Manufacturing Strategy in Nigerian Manufacturing Sector

(1= Very High, 2= High, 3= Medium, 4= Low, 5= Very low)

Statement	Rating
Q15. To what extent is the Nigerian manufacturing companies implementing modern manufacturing strategies for the manufacture of different consumer products?	1 2 3 4 5
Q16. To what extent are the manufacturing strategies adopted by the Nigerian manufacturing companies meeting international standards?	1 2 3 4 5
Q17. How do you evaluate the ability of the Nigerian manufacturing firms to successfully capture the attention and loyalty of the consumers through adoption of effective manufacturing strategy?	1 2 3 4 5
Q18. How much is the weak infrastructure of the operating environment of the country hindering the development and implementation of effective manufacturing strategy in Nigeria?	1 2 3 4 5
Q19. To what extent do you perceive major flaws in the manufacturing strategy of the Nigerian Manufacturing companies?	1 2 3 4 5
Q20. To what extent do you see the need in the Nigerian firms	1 2 3 4 5

following the patterns of other developing countries' firms to develop effective and productive manufacturing strategy?	
Q21. To what extent do you see the need for any major changes in the manufacturing strategies adopted by the Nigerian Manufacturing companies?	1 2 3 4 5

Section V – Information about Innovation in Nigerian Manufacturing Sector

(1= Very High, 2= High, 3= Medium, 4= Low, 5= Very low)

Statement	Rating
Q22. How do you see the present level of technology usage in product designing in the Nigerian manufacturing sector?	1 2 3 4 5
Q23. To what extent do the manufacturing companies of Nigeria offer different consumer products with innovative features and benefits?	1 2 3 4 5
Q24. How do you see the differences in features and benefits of the present Nigerian consumer products as compared within the past 5 -10 years?	1 2 3 4 5
Q25. How do you evaluate the present level of technological innovations by the Nigerian companies in products designing and manufacturing?	1 2 3 4 5
Q26. What is the level of Nigerian Manufacturing Sector's capabilities in offering innovative consumer products in the context of globalization and high competition?	1 2 3 4 5
Q27. What is the level of awareness among the Nigerian Manufacturing companies regarding adopting innovative designs and manufacturing techniques?	1 2 3 4 5
Q28. To what extent do Nigerian manufacturing firms give importance to innovations in the process of product designing and manufacturing?	1 2 3 4 5

Section VI – Information about Environmental Uncertainty in Nigerian manufacturing sector

(1= Very High, 2= High, 3= Medium, 4= Low, 5= Very low)

Statement	Rating				
Q29. To what level is the current business environment and market structure of Nigeria satisfying and supporting the manufacturing activities?	1	2	3	4	5
Q30. To what extent has the level of Nigerian environmental uncertainty reached where the manufacturing activities are adversely affected?	1	2	3	4	5
Q31. To what level has the non availability or difficulties in getting finance and credits hindered the growth and high quality performance of Nigerian Manufacturing firms?	1	2	3	4	5
Q32. To what extent is socio-political environment of Nigeria supportive of manufacturing activities?	1	2	3	4	5
Q33. To what extent do you think some degree of improvements could be achieved through government support for a stable and suitable environment for the manufacturing activities?	1	2	3	4	5
Q34. What level of influence do the foreign products have over the operations of the Nigerian manufacturing firms?	1	2	3	4	5
Q35. To what extent are Nigerian manufacturing firms opened towards adopting rapid environmental and technological advancements?	1	2	3	4	5

Section VII: Personal Background of the Respondent

36. Age of respondent in years? …….

37. What is your **highest** level of education? Please tick.

Compulsory school education		Technical qualification		Postgraduate university degree	
Undergraduate 'first' university Degree		Post degree professional qualification		Other ……	

38 How many different organisations have you worked for full-time? ……..

39 How many years of manufacturing experience do you have?

40. Please you may wish to make further comments about Nigerian manufacturing organizations/sector-------

THANK YOU FOR YOUR TIME, SUPPORT AND INSIGHTS.

DR UMAR M MUSTAPHA
department

Appendix D

Focus Group Interview – Schedule of Questions

Discussion Questions that Relates to performance of Nigerian Manufacturing Organizations and comparison between Nigerian manufacturing sector and those of China, India and Malaysia.

1. Distinguished participants, can you briefly introduce yourselves with special emphasis on your local and international manufacturing experience as it relates to product design, manufacturing process, manufacturing strategy, innovation and environmental challenges in the Nigerian Manufacturing sector?

2. What factors do you think play the most important role in impeding effective Product design, manufacturing process, manufacturing strategy and innovation within the Nigerian Manufacturing sector?

3. What are the major environmental challenges currently facing the Nigerian manufacturing companies?

4. To what extent do you perceive the factors that are impediments to the performance of the Nigerian manufacturing organizations as internal factors that is factors within the control of the organization?

5. To what extent do you perceive the factors that are impediments to the performance of the Nigerian manufacturing organizations as external factors that is factors outside the control of the organization?
6. What are the key factors confronting the manufacturing firms of Nigeria in maintaining high performance at domestic level?

7. What are the main influential factors that hinder the high quality performance and growth of the Nigerian manufacturing sector at international level?

8. Do you think the present situation has become more challenging and demanding for the Nigerian manufacturing firms as compared with past 10 – 15 years? i.e. Since the country's return to democratic governance in 1999.

9. Do you think that as compared with last 10 – 15 years, the Nigerian manufacturing sector will face more challenges and demanding situation in the coming 5- 10 years?

10. Which of the following attributes is weakest in the Nigerian Manufacturing sector in comparison with the Indian, Chinese and Malaysian manufacturing sectors?
    a. Product Design
    b. Innovation
    c. Manufacturing Strategy
    d. Manufacturing Process
    e. Environmental Uncertainty

11. Based on your knowledge and experience, to what extent do you see the level of difference in the performance of Nigerian manufacturing sector as compared with those of China, India and Malaysia in terms of product design , manufacturing process, manufacturing strategy, Manufacturing innovation, and environmental uncertainty?

12. Based on your knowledge and experience, to what extent does the social and economic stability of China, India and Malaysia make the difference in the performance of their manufacturing sectors as compared with that of Nigeria?

13. Based on your knowledge and experience, to what level is the performance of the manufacturing sectors of these countries contributing to the economic growth as compared with that of Nigeria?

14. Based on your knowledge and experience, to what level can the Nigerian manufacturing sector improve by following the policies and strategies of manufacturing sectors of these developing countries?

15. Finally distinguished participants, what are your recommendations and suggestions that the Nigerian manufacturing sector has to emphasise, which will bring improvement in the overall state of the Nigerian manufacturing sector?

Appendix E

Ethical Clearance Letter – see next page

University of Southern Queensland
TOOWOOMBA QUEENSLAND 4350 CRICOS: QLD 00244B NSW 02225M
AUSTRALIA
TELEPHONE +61 7 4631 2300

www.usq.edu.au

OFFICE OF RESEARCH AND HIGHER DEGREES
William Farmer
Ethics Officer
PHONE (07) 4631 2690 | FAX (07) 46311995
EMAIL will.farmer@usq.edu.au

Wednesday, 6 January 2010

Dr Umar Mustapha c/o Dr Harry Ku
Faculty of Engineering
USQ Toowoomba Campus

Dear Umar,

Thankyou for submitting your project below for human ethics clearance. The Chair of the USQ Fast Track Human Research Ethics Committee (FTHREC) recently reviewed your responses to the FTHREC's conditions placed upon the ethical approval for the above project. Your proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research* and full ethics approval has been granted.

Project Title	An Investigation of Manufacturing Systems, Product Design and Environmental Uncertainties in the Nigerian Manufacturing Organizations, and Comparison with the Manufacturing Sectors of China, India and Malaysia
Approval no	H09REA155
Period of Approval	06/01/2010 – 06/01/2011
FTHREC Decision	**Approved**

The standard conditions of this approval are:

(a) conduct the project strictly in accordance with the proposal submitted and granted ethics approval, including any amendments made to the proposal required by the HREC;
(b) advise the HREC (email: ethics@usq.edu.au) immediately if any complaints or expressions of concern are raised, or any other issue in relation to the project which may warrant review of ethics approval of the project;
(c) make submission to the HREC for approval of any amendments, or modifications to the approved project before implementing such changes;
(d) in the event you require an extension of ethics approval for this project, please make written application in advance of the end-date of this approval;
(e) provide the HREC with a written "Annual Progress Report" for every year of approval. The first progress report is due 12 months after the start date of this approval (by **06/01/2011**);
(f) provide the HREC with a written "Final Report" when the project is complete;
(g) if the project is discontinued, advise the HREC in writing of the discontinuation.

For (c) to (f) proformas are available on the USQ ethics website: http://www.usq.edu.au/research/ethicsbio/human

Please note that failure to comply with the conditions of approval and the *National Statement on Ethical Conduct in Human Research* may result in withdrawal of approval for the project.

You may now commence your project. I wish you all the best for the conduct of the project

Yours sincerely

William Farmer
Ethics Officer
Office of Research and Higher Degrees

APPENDIX F

Associated Publications

1. *Mustapha U. M., Ku H. and Goh S (2010); Literature review of past and present performance of the Nigerian manufacturing sector.* Proceedings of the IMechE, Part B: Journal of Engineering Manufacture. *DOI 10.1243/09544054JEM1818. Online ISSN 2041-2975*. (SEE PAGE II BELOW)

2. Mustapha U. M., Ku H. and Goh S (2009); *Research Design for Investigation of Nigeria Manufacturing Management.* Rough Sets and Knowledge Technology, 4th International Conference, RSKT 2009, Gold Coast, Australia, July 14-16, 2009. Proceedings. Lecture Notes in Computer Science 5589 Springer 2009, ISBN 978-3-642-02961-5. (SEE PAGE XXII BELOW)

3. Mustapha U. M., Ku H. and Goh S (2010). The Importance of Product Design in Nigerian Manufacturing Sector. *Competition and Challenge: The journal of global political economy.* Paper under review. (SEE PAGE XXX BELOW)

4. Mustapha U. M., Ku H. and Goh S (2010). *Are African manufacturing enterprises competitive in terms of manufacturing process*? *International Journal of Production Research.* Paper under review. (SEE PAGE L BELOW)

5. Mustapha U. M., Ku H. and Goh S. (2010). Impacts of Manufacturing Strategy and Innovation in Nigerian Manufacturing Success. Paper has been sent to Proceedings of the Institution of Mechanical Engineers, Part B, *Journal of Engineering Manufacture*. Verdict expected soon. (SEE PAGE LXVI BELOW)

6. Mustapha U. M., Ku H. and Goh S (2010). *Environmental Factors Affecting Nigerian Manufacturing Organizations. Journal of Engineering and Technology Management.* Paper under review. (SEE PAGE C BELOW)

7. Mustapha U. M., Ku H. and Goh S (2010). *Decline of Manufacturing in Africa: China and India responsible? Or who else. International Journal of Advanced Manufacturing Technology.* Paper under review (SEE PAGE CXVI BELOW)

A Literature Review of Past and Present Performance of Nigerian Manufacturing Sector

U M Mustapha, S Goh and H Ku

Faculty of Engineering and Surveying,
University of Southern Queensland,
West Street, Toowoomba, 4350, Australia

Corresponding Author:
Title : Dr.
Name : Harry Siu-lung Ku
Affiliation : Faculty of Engineering and Surveying,
University of Southern Queensland.
Tel. No. : (07) 46 31-2919
Fax. No. : (07) 4631-2526
E-mail : ku@usq.edu.au
Address : Faculty of Engineering and Surveying,
University of Southern Queensland,
West Street, Toowoomba, 4350,
Australia.

Abstract: This paper attempts to examine the past and present performance of the Nigerian manufacturing sector. The major problems and limitations that impede the growth of the sector are analysed. In the 1960s and 1970s after the country's independence, the Nigerian manufacturing sector had been developing positively as a result of direct foreign investment. Foreign companies had introduced new manufacturing technology that saved time and cost, and improved the quality of the products manufactured. Despite this initial flourishing growth phase though, the sector was not able to successfully meet local demand and cost the country much to pay for manufactured goods. From the end of 1980s to date, many problems were found that were responsible for low growth and development in the manufacturing sector. Some of these problems were dependency on oil for income, weak infrastructure, shortage of skilled labour, lack of adequate financial resources, lack of proper management and planning, and so on. The paper concludes that it is essential to work towards resolving all these problems in order to rejuvenate Nigerian manufacturing establishments so that the manufacturing sector can play an important role in the country's economic development.

Keywords: Nigeria, manufacturing sector**,** oil-based economy, developing countries.

1. Introduction

This paper presents a review of research studies conducted during the last forty years that describe the performance of the manufacturing sector of a particular developing country. The focus country for this paper is called Nigeria and it is located in sub-Saharan Africa. The purpose of the paper is not only to evaluate and examine the performance of the Nigerian manufacturing sector, but also to find what gaps there may be in the literature so that further study can be focused on filling these gaps.

While discussing the Nigerian manufacturing sector, it is very important to understand its entire basic economic structure. Nigeria depends largely on oil for its export and this dependence has a significant negative impact on other sectors. To effectively study the manufacturing sector then, it is necessary to study the role of the oil sector and its corresponding effects. Thus, the review of the studies related to the Nigerian manufacturing sector performance is led by the study of the oil-based economy of Nigeria.

2. Nigeria – An oil-based economy

The Energy Information Administration (EIA) reported that Nigeria is the 11th largest producer of crude oil with a production output of 2.5 million barrels of crude oil per day as of December 2006, and it is among the influential members of Organisation of Petroleum Exporting Countries (OPEC) [1, 2]. Because of this, the oil price decline affects the economy of Nigeria considerably; and in turn, also affects country's economic activities such as working conditions and productivity [3, 4].

A researcher, Hale [5], revealed that since the entire economy of Nigeria depends on oil revenue and the country has very large oil reserves, it has a great potential to build a strong and vibrant economy simply on the basis of huge oil revenues. Unfortunately, oil revenues failed to improve the poverty level of the country and it was among the world's poorest countries until 2002. The researcher pointed out some of these main reasons for this failure. He observed that while the Nigerian government did set the target for some reforms related to spending, inflation and privatization, very few of these reforms were actually put into practice and as a result the International Monetary Fund (IMF) discontinued the stand-by credit agreement with Nigeria. Hale also stated that political instability and corruption further hindered the development of the economy. The researcher then concluded that in order to accelerate the growth of its economy, Nigeria should reduce the level of oil dependency and concentrate on the development of other sectors like agriculture, energy, transport and manufacturing.

Another researcher, Obadina [6], also concluded that the country possesses great potential to prosper economically on the basis of its huge oil reserves. He also states though, that due to its management legacy the country still faces some major problems like inadequate infrastructure, high level corruption and inefficient deployment of resources. Oil, rather than be the blessing for the country it could be, has become a major source of debt. Due to fluctuations in the oil prices in the global oil market, there is a burden on the country as it has to pay a large amount for its import bills.

In another study, Rankin et al [7] observed that when there was boom in oil prices during

the 1970s, the country committed the serious mistake of neglecting other sectors like agriculture, mining and micro, small and medium manufacturing. At that time the country was earning enough from crude oil exports that could have been used to develop other sectors; and yet these other sectors were ignored because of dependence on this very income. There were also other factors that precipitated the decline of particular sectors. For example, from 1970 to 2005, many foreign countries expressed interest in the manufacturing businesses in Nigeria such as steel, wood, food, electronics, chemicals and vehicles sub-sectors among others. But due to regulations and other restrictions, need for capital and expertise, only a few companies were able to establish a significant presence in those sectors. However, a number of those foreign companies that were able to establish joint ventures with Nigerian companies were substantially large. As such, some sectors such as fuel refineries, electronics, chemicals and vehicles have seen a substantial foreign ownership and product output growth over the years as shown in graph 1 while those of others declined, such as textile, wood and plastics. The main difference in the interests of the foreign firms in the industries came from legislation and restrictions to enter the market.

(Graph 1 moved to separate file from here)

Onayemi [8] put forward that the economy of Nigeria is too dependent on oil and it is not progressing significantly due to inconsistency in macro economic policies for the growth of different sectors in the economy. When the government only works to safeguard the oil companies' interests, the price of oil does not remain at an affordable level and the manufacturers have to pay more for the energy resources they consume in the manufacturing process. When there is news about the discovery of more crude oil wells in the country, foreign investors start paying attention towards it, resulting in the rise of foreign direct investment (FDI) as well as the employment rate. In this way, the economy of Nigeria is determined by oil production and oil prices. It is therefore evident that Nigeria remains highly dependent on oil, which accounts for 80% of its foreign exchange during the last four decades. This policy has proved to be quite harmful to the country because oil price fluctuation has a negative impact on the economy, causing a certain level of instability and uncertainty. The government neglected the non-oil sectors including manufacturing industry which has made Nigeria the least industrialized country in the region.

Eedes [9] studied the economic conditions of Nigeria and observed that since Nigeria is one of the least industrialized countries of the sub-Saharan African region, this resulted in some major weaknesses in the economic structure of the country. These varying levels of negligence contributed to the collapse of the country's basic infrastructure as well as its social services in 1980s. The fluctuation in oil prices further contributed to the economic instability of the country and poverty was widespread, especially in the rural areas [7].

Though the Nigerian manufacturing sector cannot support economic development in its present condition, it has great potential since Nigeria is one of the most attention-grabbing markets of the region by having about 140 million consumers and millions more consumers in the neighbouring countries [10]. The importance of the manufacturing sector is also realized from the fact that private consumption expenditures are

significantly increasing in the country up to the rate of 15 to 20% per year. However, many problems are hindering the growth of the manufacturing sector in Nigeria and as a result the country is progressing very slowly towards economic diversification. Dipak and Ata [11] summed up the economic scenario in Nigeria and the role of the manufacturing sector by identifying the main hurdles that mostly and historically affect its development and growth. These barriers include insecurity, political instability, market-distorting, state-owned monopolies, weak infrastructure and unavailability of finance while Adenikinju [12] added excessive bureaucracy and rampant corruption.

3. Historical performance of the Nigerian manufacturing sector

Adenikinju and Chete [13] conducted an empirical analysis of the performance of the Nigerian manufacturing sector over a 30-year period and observed that the sector was performing with satisfactory growth levels from 1970 to 1980. However, after that phase there was a sharp decline in the growth and profitability of the Nigerian manufacturing sector. Especially after 1983, the negative effects of the oil price collapse in the international oil market can be clearly seen on the sector's performance. Due to that global oil crisis, the revenues of the Nigerian government sharply declined which resulted in reduction in foreign exchange earnings. This in turn forced the government to take several initiatives with the intention of strictly controlling its trade. There were several import duties enacted in the form of import licences and tariffs, and some quantitative restrictions were also imposed on the importation of certain items. As a result, the manufacturing sector was badly affected because the manufacturers faced multiple problems when obtaining raw materials and spare parts for their products and processes. As a result of massive cutbacks in raw materials and spare parts, many of the country's industries were shut down and the capacity utilization in the manufacturing sector declined. For example, between 1977 and 2007, the Nigerian bicycle manufacturing sub-sector recorded a systematic decline in capacity utilization by about a total of 485%; that is, from 948,000 units of bicycles in 1977 to 161, 500 units of bicycles in 2007. Details are shown in Graph 2. This disturbing trend was also observed by Adenikinju and Chete in most of the other manufacturing sub-sectors in the country [13].

(Graph 2 moved to separate file from here)

Dipak and Ata stated that the effects of the trade restrictions resulting from the oil price crisis were clearly observed in the form of a 25% decline in the real output of the manufacturing sector from 1982 to 1986. Although the annual growth rate of the Nigerian manufacturing sector was 15% between 1977 and 1981, the government trade restriction measures resulted in the succeeding sharp decline in the growth rate of the sector [11]. The share of the manufacturing sector in the total GDP of the country also clearly declined during this era. In 1977 there was a 4% increase recorded in the manufacturing sector share in GDP and this reached the level of 13% in 1981, but after that it declined to less than 10% in just a few years. Dipak and Ata [11] and Adenikinju and Chete [13] concluded that the unavailability and inadequacy of the companies' access to the raw material and spare parts needed were among the major factors that contributed towards the decline in the growth rate of the manufacturing sector especially after 1981. Hence, the oil price shock is identified as the reason behind the policies that ultimately resulted in the decline of manufacturing sector's growth.

Adejugbe [14] examined the impact of the Nigerian trade policy on the manufacturing performance of Nigeria after the previously discussed observed decline. The researcher studied manufacturing sector performance after 1985 and observed that some significant steps were taken by the Nigerian government in an attempt to make the Nigerian trade regime liberal, and also to promote manufacturing and import-export activities. The adaptation of a flexible exchange rate mechanism, along with the some trade liberalization policies, brought some major changes to the scenario as these steps helped reduce tariffs and trade rates. At the same time, duties on the importation of foreign goods were also raised, especially of those competing with domestic products. In the same way there were also some steps taken to reduce import duties on many of the raw materials and spare parts that were used in the manufacturing sector, the factor pinpointed for the previous years' decline. These steps were taken by the Nigerian government with the objective of providing the local manufacturing organizations with a sense of protection so that they could be motivated to become more productive and efficient.

Anyanwu [15], with findings similar to that of Adenikinju and Chete, pointed out that the collapse of the world oil market in the early 1980s and the prolonged economic recession resulting from this collapse contributed to the sharp fall in the foreign exchange earnings of Nigeria. This further led to a fall in the performance level of the manufacturing sector of the country. The introduction of the Structural Adjustment Programme (SAP) in 1985 was expected to bring an improvement to the situation, but unfortunately no notable improvement was observed. As a result of the continuing low performance of the manufacturing sector, along with other important reasons, today Nigeria is among the more poverty-driven nations of the world [16].

Ukaegbu [17] observes that conducting a complete analysis of the Nigerian manufacturing sector is a complex issue because there is a lack of adequate data about the productivity levels of the Nigerian economy. In particular, there are little authentic data related to the productivity of the Nigerian manufacturing sector. However, some of the research studies conducted at different levels does give some viable information about the performance of the manufacturing sector of the country through the years [17]. For example, an ad-hoc study conducted in 1989 by Chete and Adenikinju [18] indicated that the overall productivity level of the Nigerian manufacturing sector over the years has seen very little increase and most of these companies have even faced a decline in productivity as well as profitability. These findings were further confirmed by a report by the Manufacturers' Association of Nigeria (MAN) which revealed that there was a generally negative trend in the growth of the Nigerian manufacturing sector during the period of 1980-1989. The report also stated that the expectations were low of observing any considerable improvement in the situation. The research studies conducted after that period confirmed this expectation, as they provided evidence that the trend of negative productivity continued and that neither was there an improvement in the profitability level of the sector well into the 1990s and 2000s [19].

In 2000, Adenikinju and Alaba [20] conducted an empirical study which evaluated the Nigerian manufacturing sector's performance with regards to the relationship between productivity, performance and energy consumption within the manufacturing

organizations. Utilizing an aggregate model, the researchers measured the changes in the total factor productivity of the sector relative to the change in energy consumption. The research concluded that efficiency and productivity of the Nigerian manufacturing organizations are indeed related to the energy supply and energy price. While the energy resources were found to play a critical role in the manufacturing sector though, it was also discovered that the energy source alone cannot effectively improve the performance of the manufacturing sector in Nigeria. An important point identified in the research was that the manufacturing sector is too wedded to using old technology and as such, there is a great need for the adoption of more advanced energy-efficient technological devices and techniques. For this reason, reforms concerning the prices of energy options alone do not significantly affect the performance of the sector because it is hindered by the need for improved technology and energy supplies. Thus, the reforms in the energy sector need to happen alongside technological reforms, otherwise the manufacturing organizations cannot entirely enjoy the advantages of the energy resources.

Ayanwale [2] studied the effects of foreign direct investment on the performance of the Nigerian economy and manufacturing sector, and revealed that the country is striving to attract more foreign investors. This is so that the operations and activities of the manufacturing sector can be supported by the revenue gained through these investments. However, available statistics of the Nigeria's manufacturing and macro-economics data does not paint a good picture of manufacturing contributions to GDP and national employment as shown in table 1. For example manufacturing contributions to GDP has been below 10% between 1990 and 2005, and the country's expectation that it will reach 15% by 2010, from the trend, seems almost impossible. Other manufacturing macro-economics variables and their trends are also shown in the table.

(Table 1 moved to separate file from here)

Another vital point that Ayanwale's work brought to light is that while foreign investments in manufacturing could be beneficial to the economy, it is necessary that human resource issues are resolved as well so that the financial resources can be effectively utilized [2]. In a survey report for the United Nations Industrial Development Organization (UNIDO), Malik et al [21] discloses that for many years the Nigerian manufacturing sector has been working with mostly unskilled and unqualified labour. Actually, to date, the qualifications and skill level of the sector's workforce is still very low. This is an important issue as it directly affects the quality of the manufactured products in Nigeria. As it turns out, the reason behind the employment of unskilled labour is the inability of the manufacturers to pay actual skilled labour well.

Mazumdar and Mazaheri [16] argue that average wages are very low in most of the manufacturing firms in Africa as the owners settle for unskilled labour. This is because highly skilled labourers come with high salaries that the firms cannot afford, thus, they keep on employing unskilled labour on low wages. So though there were employment opportunities in the manufacturing sector, they did not alleviate poverty levels; all while the quality and standard of the labour were stagnant. The researchers suggested that the manufacturing companies must realize the importance of investing in skilled labour so that the manufacturing process can be run on updated methods. Also, the overall poverty

level could be raised by the stimulation of paying good wages to skilled labourers [16].

Alli [10] reviewed the situation and stated that after going through several ups and downs, the final shape of the Nigerian manufacturing sector is mainly made up of a few players. These players are the multinational, national, regional and local manufacturers, investors, and companies. It was also disclosed that while the multinational companies are still operating and surviving in the country because of strong financial and resource support, the other operators have either disappeared from the scene or are struggling to survive in the manufacturing industry. This is because of the unpredictable policies and strategies implemented by the government, effects of globalization, and the lack of raw materials obtained locally for the manufacturing process. As a result, the aforementioned players of the sector started diminishing from the scene, and the productivity and efficiency of the manufacturing sector were negatively affected. At present, the capacity utilization in the sector remains lower than 35% [2]. This also provides evidence and reasons to conclude that the Nigerian manufacturing sector is inefficient.

The Nigerian Bureau of Public Enterprises itself identified some of these main barriers that affected, and continue to affect, the growth and development of the Nigerian manufacturing sector. Their reasons include high interest rates, unpredictable government policies, non–implementation of existing policies, ineffective regulatory agencies, infrastructural inadequacies, dumping of cheap products, unfair tariff regime, and low patronage [11]. On top of these, as mentioned, a skilled workforce and foreign investments are also in short supply.

In summary, the retrospective analysis of the manufacturing sector of Nigeria could serve as a lesson for other countries. It shows how the mismanagement of resources and the negligence of an important sector can contribute to the low performance of the whole economy. In Nigeria, the government used to place sole emphasis on the oil sector and as a result the manufacturing sector failed to prosper. Now, even after the spike in oil prices, the country can only look towards a very insignificant contribution from the manufacturing sector caused by the inadequate policies and planning of the past.

4. Present situation

Alli [10] reviewed the more current performance of the Nigerian manufacturing sector by surveying the results of a study conducted in 2007 by the Manufacturers Association of Nigeria (MAN). The report disclosed that during the last few years many of the manufacturing companies in the country have, as the past studies predicted, faced bad times. It was discovered that only a meagre percentage of manufacturing companies (10%) are operating at a sustainable level, whereas as much as 60% are going to shut down or have already shut down after facing several series of financial and other kinds of crises. Many factors were identified by MAN to be the root cause of the problem. The reasons behind the low growth and performance of the Nigerian manufacturing sector during the last few years include “high production costs caused by energy, high interest and exchange rates, influx of inferior and substandard products from other nations, multiplicity of taxes and levies, poor sales partly as a result of low purchasing power of the consumers, bogged down with delay in clearing consignments due to existence of multiple inspection agencies at the ports, etc” [22].

However, according to Mazumdar and Mazaheri, despite this uncertainty in the business environment some Nigerian companies are successfully operating in the country and getting high returns on their investments through superior competitive performance [16]. The researchers analysed the strategies and management planning of two Nigerian firms that have achieved a high level of performance in the business sector. They then highlighted the main factors that contributed towards the success of these organisations. Some of these factors were the introduction of transparent management policies, proactiveness in competitive strategies, among others.

Dipak and Ata [11] argue that the main problems facing the Nigerian manufacturing sector are the ongoing advancements in technology, as these are taking the international manufacturing market towards higher levels of competition. When there is less protection for companies, these unprotected companies have to focus more and more towards the quality of their products and do so by increasing their expenditure on research and development. In Nigeria however, the research and development work is not being done at a good enough level required for the constituents to even see a steady growth in the performance of manufacturing organizations. It becomes necessary then, for the Nigerian government and the private sector partners to intervene in order for the situation to improve.

Malik et al [21] discloses, in a survey report administered under UNIDO's Centre for Study of the African Economy, that the skills and technology usage levels in the Nigerian manufacturing sector are not very satisfying. Not only that, the report also revealed that the Nigerian manufacturing sector is not even open towards the usage and adoption of the new technologies and skills; thus stagnating and even negatively affecting the efficiency of the firms. The reason behind giving less importance to new technologies and skills is traced back to the deficiency of adequate investment in the sector. Only half of the companies that participated in the survey disclosed that they made investments in technology during the period under study, this alone shows the trend in technology investment in the sector. The survey also divulged that the lack of financial facilities is exacerbated by the unwillingness of the investors to give their money to the manufacturing companies. When firms invest less in technology, they also invest less in the skilled labour needed for these; and with no other sources for capital for investment they are not in a position to remedy the situation. With barely any advanced machinery and techniques of production, the firms are rendered unable to compete in a larger scale. And as all of these issues continue to result in the low level of competitiveness of the Nigerian manufactured products, the overall efficiency and productivity of the sector will always remain on a lower scale [21].

Ojowu [23], with his analysis of the situation of the Nigerian manufacturing sector, came to the point that capacity utilization is an important issue that must be properly addressed in all discussions and all measures to be taken in the future. The researcher argues that the sector is progressing very slowly due to low capacity utilization. Issues associated with capacity utilization such as capacity decline, capacity expansion and capacity mortality are essential discussion points in the issue of bringing quality into the performance of the Nigerian manufacturing sector. On top of these issues, the burden of external debt is also affecting the sector's performance. The researcher also argues that

the government is not giving enough attention towards the policies related to the manufacturing sector as compared to those of other sectors. To contend with Ojowu's last point though, reforms must also be applied to different sectors that are associated with the manufacturing sector and not just the manufacturing sector itself; as the high or low performance of one sector can affect the progress of the others. For example, if the government works to improve infrastructure then the manufacturing of products will also be improved.

Enebong [24] predicts that the level of the Nigerian manufacturing organizations' performance will continue to see a decline because as it is now, the manufacturers will have even more problems in accessing raw materials due to stiff competition from foreign firms. He theorizes that many of the policies implemented by the government in the late 1990s are still acting as barriers to manufacturing sector growth. Some of these policies include backward integration and the inward orientation strategies towards import substitution. The private sector also failed to play a significant role in the manufacturing industry; and there are certain reasons behind this such as import barriers, tariffs, licenses and other policies that resulted in raw materials unavailability.

Alli [10] however, points out that the government plays a very important role in the entire scenario of bringing improvements into the Nigerian manufacturing sector. The researcher observed some positive signs from the present Nigerian government and identified some of the major strategies that are being adopted with the intention of improving manufacturing sector performance. According to Alli, the government has realized that the manufacturing sector can act as the backbone of the economy and as it progresses in a positive direction, the country will consequently grow and prosper also. In this regard, the government has decided to make sure that the manufacturing sector will receive access to the domestic, regional and international markets. This is of course after adding value to the companies' products; and for this, the sector will need to take advantage of the country's oil and gas sector. The Nigerian government also seeks to apply the Public Private Partnership (PPP), wherein the government will invest in the development of infrastructure and will become a facilitator to the manufacturing sector. In effect, the manufacturing industry will gain great advantages from the improved infrastructure and the private sector will also be encouraged to invest in different productive manufacturing industries. Moreover, the government is also considering the cluster concept suitable for the economic condition of the country, keeping in view the geographical proximity and other ground realities.

5. Problems and limitations

The performance of the Nigerian manufacturing sector over the last four decades shows that there are some important problems that acted, and are still acting, as barriers to the growth of this sector. Researchers have also argued that some basic limitations are impeding the growth and development of the sector, even despite past studies and proposed solutions. In order to identify these core challenges, many of the researchers have conducted studies of the past and present conditions of the manufacturing industry of Nigeria. These researchers have conducted different quantitative and qualitative studies during different periods and have identified certain important limiting issues to

aforementioned solutions.

Bigsten and Soderbom [25] conducted a study which investigated the main challenges confronting the manufacturing firms using ten selected variables as shown in Graph 3. From the graph, it is clear that the first perceived variable retarding manufacturing firms is physical infrastructure problems (98%) followed by stiff competition from Asian products (90%) and then inappropriate technology (71%) and so on as shown in the Graph.

(Graph 3 moved to separate file from here)

One other approach to identifying the causes of manufacturing failure in Africa is to classify them according to external and internal sources, as illustrated in Table 2.

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Indeed, when reviewing the above values, there is no general consensus in terms of the variables for forecasting either failure or success; although capital, appropriate technology and experience are featured more frequently.

Ayeni [26] identified the core problems surrounding the Nigerian manufacturing establishments after he analysed their pattern of growth. The researcher pointed out that the establishments are lagging behind in attaining sustainable growth because most of the time, their operators and the Nigerian authorities reacted to market situation by formulating short-term policies and strategies. The researcher pointed out an important flaw in the economic policies of the country by arguing that there is less attention given to satisfying the needs of the domestic consumers, thus the demands for locally manufacturing products and goods remain low. In addition to Ayeni's findings, the acute shortage of infrastructure can also be identified as a factor that frequently hinders the manufacturing growth because organisations and agencies related to the provision of different infrastructures often failed to adequately deliver. This affects the flow of work in the manufacturing sector. At the same time the manufacturers and the investors also need motivation and encouragement so that the investors can become open towards investing in the different manufacturing firms. Ultimately this would lead to the manufacturing companies obtaining access to the finances needed not only to keep their manufacturing operations afloat, but to run more effectively.

Alos [27] analysed the business environment of Nigeria and observed that the performance of the manufacturing sector has been very uncertain, even nearly chaotic, for many years. The researcher also pointed out another important barrier that exists in the Nigerian manufacturing sector, and that is the low rate of capital utilization; not unlike the conclusion put forth by Ojowu [23]. He observed that in the manufacturing sector there is gross underutilization of resources and only 30% to 40% of the capital is being utilized in this sector due to "frequent power outages, lack of funds to procure inputs, fall in demand for manufactured goods and frequent strikes and lockouts by workers and their employers" [27].

Okejiri [28] revealed that one of the largest constraints for the high productivity of the Nigeria's manufacturing sector is, again, the low level of technology; as advancements in

technology are changing the manufacturing sectors of countries all over the world. Developing countries are rapidly adopting new technologies so that they can secure higher productivity and revolutionize their manufacturing industry. Unfortunately, the Nigerian manufacturing companies are still not focusing enough on acquiring modern machinery and as mentioned, up to now they are still using the same methods and machinery that were introduced as far back as the 1960s and 1970s [29]. It is this stagnant, almost stubborn, mindset that greatly limits this solution for the future growth of the sector.

Meagher [30] meanwhile viewed the problem of Nigerian manufacturing sector from the perspective of inadequate academic research and development support from the Nigerian universities and other like institutions. He recommended that the Nigerian research institutions should be adequately funded by the Nigerian government and public, private, and even multinational organizations. This is so that these institutions will engage in purposeful researches that will help revive the decaying manufacturing sector. These institutions may also essential in preparing for the challenges of new oil discoveries; especially in the deep platform areas and in the northern part of the country where initial studies conducted by foreign oil companies have shown the possibility of the presence of oil. On the part of the manufacturing firms, the researcher also concluded that they must set up or upgrade their research and development departments so that new technologies and new raw local raw materials are discovered, tested and used.

A study conducted by Havrylyshyn [31] pointed out some of the other major problems that act as barriers to high quality growth and performance in the Nigerian manufacturing sector. The researcher concluded that while the government of Nigeria has shown its willingness to promote and support the growth of the manufacturing sector, despite the measures they have taken there is a long way to go for the manufacturers to progress in an efficient manner. According the researcher's findings, investors in the manufacturing sector often lack a business-friendly environment. This environment is due to the legacy of the past misguided trade-related government policies that caused negative impact on investment-related operations; damage that cannot be easily repaired.

In this same vein, Adenikinju [13] blamed the government for the current inefficient performance of the Nigerian manufacturing sector. The researcher claimed that the increased interference of the government in different issues related to the manufacturing industry minimized the role of the private sector due and as such, the contribution of the private manufacturers seems to be very low in terms of manufacturing output.

Nishimizu and Robinson [32] observed that the Nigerian manufacturing sector has been in great need of reform for many years as the sector has been unable to support the economy of the country due to its many problems. For example, the manufacturing sector strongly feels the need for private sector friendly policies so that the entire manufacturing process can be boosted to a private sector level, and so that there could be better capacity utilization in the sector. The researchers also pointed out that there is a great need for many reforms in the sectors related to manufacturing, such as the power sector. As mentioned, when the power sector starts to progress effectively then the manufacturing

sector will also perform well with the support of a reliable power supply. In the same way the infrastructure also requires improvement including the railways, roads and other communication systems. Although the government has put forth reforms regarding these issues and those put forth above by Havrylyshyn and Adenikinju, it is not until they are fully implemented that progress will be underway for the manufacturing sector, and even then time is needed for adjustment and stabilization.

Talabi [33] argued that the problems associated with the decimal performance of the Nigerian manufacturing originations are the by-products of policies and strategies that have been in practice for many years. To resolve these challenges, the government must focus upon the formulation of an equipment-leasing law that will work to improve the weak infrastructure of the country. If this is implemented, in turn the manufacturers will be encouraged to manufacture high quality products. It is also vital that there must be good management of funds and donations in a proper manner to assist manufacturing activities. Many of the funds and finance facilities provided by international and regional financial and trading institutions like the World Bank and the African Development Bank (ADB) are highly mismanaged at a national level; as a result, the fruits of the funds do not reach the manufacturing sector [11]. If the government succeeds in providing the funds to the manufacturers, and if the manufacturers will make positive use of the funds, then the manufacturing industry of Nigeria can progress and make its presence valuable at the regional and international level.

6. Conclusions

The above literature review has presented a detailed account of information related to the past and present performance of the Nigerian manufacturing sector. It is revealed that the economy of Nigeria depends heavily upon the oil sector and fluctuations in oil prices in the global market have contributed towards the economic instability of the country. The present government of Nigeria is though, is slowly aiming to diversify its economy towards the non-oil sector. At present, the growth and performance of the Nigerian manufacturing sector is found to be in great need of reforms and improvement because the share of manufacturing sector in the country's GDP is just at 5% which is very low. It is explained that there is a great need to increase the contribution of Nigerian manufacturing organizations in the economic growth of the country, and it has great potential to do just that if reforms are handled correctly. For this happen though, the government of Nigeria is also required to come up with support policies that will encourage and promote this and more private sector participation.

There are some problems highlighted in the review that continue to pull down the Nigerian manufacturing businesses that are difficult to address locally; as the sector is facing great challenges due to globalization and high competition. Though within the country, issues of human resource management, technology adoptability, cost competitiveness and availability of skilled and qualified labour are some of the common challenges hindering the progress of the sector. The Nigerian government appeared initially unaware of these challenges because it was only in the past few years that they increased the importance of manufacturing sector. The role of the government is important in increasing the industrialization Nigeria, and the government even benefits

from doing so because improving the sectors of the country will help it grow and prosper.

The paper also identified some gaps in the literature. Most of the past research studies evaluated the performance of the Nigerian manufacturing sector within the boundaries of trade liberalization or technological adoptability. For example, there appears to be little to no presence of studies that have compared the performance of the Nigerian manufacturing sector with that of other developing countries. Also, the past researchers have only identified a few strategies that are successfully being utilized by developing countries, as these can be applied to improve the Nigerian manufacturing sector. Although raising the level of research and development was cited by many researchers as a possible improvement strategy, there may be other cues that Nigeria can take from other developing countries. This gap in the literature should be filled in by future researches. The resulting detailed account of strategies and policies can be adopted by Nigeria to attain high quality performance of the manufacturing industry. It is also suggested that Nigerian research institutions should be well supported by the government and other public and private companies in order to conduct the researches needed to finally arrest the declining trend in the Nigerian manufacturing sector.

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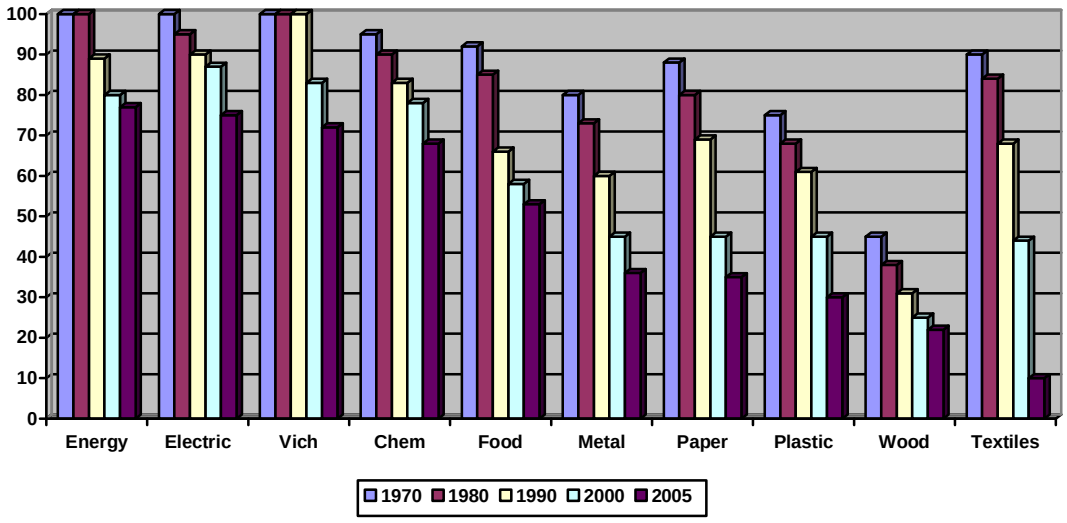
List of Figures and Tables

Graph 1

Percentages of Share of Output of Foreign Owned Manufacturing Firms in Nigeria.

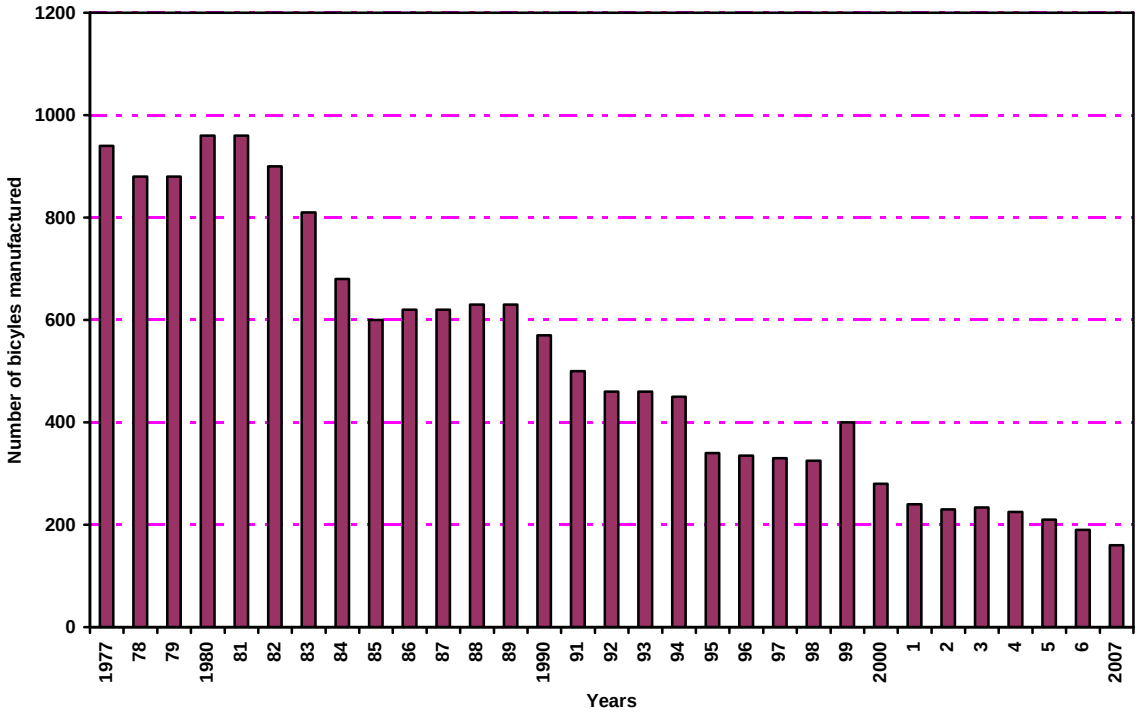


Source: Constructed from Data of Manufacturers Association of Nigeria (MAN) 2008.

Graph 2.

Capacity Utilization in Nigerian Manufacturing Sector (1977- 2007):

Number of Bicycles Produced Per Annum in Thousands.



Source: Constructed from BI-MAN of Manufacturers Association of Nigeria (MAN) 2008.

Table 1

Manufacturing and Macro-Economic Data and Forecasts for Nigeria

	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2010**
Manufacturing Contri to GDP (%)	6.9	6.7	6.5	6.5	6.4	6.2	5.5	15
Share of workforce in Manufac (%)	7.5	7.4	7.4	7.3	7.2	6.8	6.8	20
Industrial Prod. Index % Change	-3.83	3.46	0.36	2.91	2.83	-0.17	4.43	5.00
GDP Growth %	0.30	1.50	5.40	3.00	3.50	10.20	5.50	5.60
Fixed Capital Formation % Change	-7.14	1.20	5.74	2.76	0.82	3.47	3.66	3.88
Govt Consumption % Change	24.57	1.48	5.63	2.68	0.77	3.46	3.63	3.77
GDP Per Capita US$	1089.6	290.3	379.8	394.7	370.2	356.9	413.6	479.8
Inflation (CPI) %	10.32	4.76	14.52	12.96	12.88	14.03	15.72	12.82
Policy Interest Rate %	13.50	12.80	13.00	13.50	13.50	13.00	13.06	13.00
Long Term Interest Rate %	18.18	20.29	21.27	23.44	24.77	20.71	19.18	16.15
Budget Balance % GDP	-4.63	-4.51	-3.24	-3.07	-3.03	-2.96	-2.57	-2.35
Population in millions	120.8	123.9	126.9	129.8	132.8	135.6	138.7	161.8
Population Growth %	2.67	2.55	2.43	2.34	2.24	2.14	2.27	2.34
Current Account Balance US$bn	-4.24	0.51	8.31	3.83	2.62	5.07	2.54	6.37
Current Account Balance % GDP	-3.22	1.41	17.24	7.48	5.33	10.48	4.42	9.35

Source:UNCTAD World Investment Report, 2006

Table 2

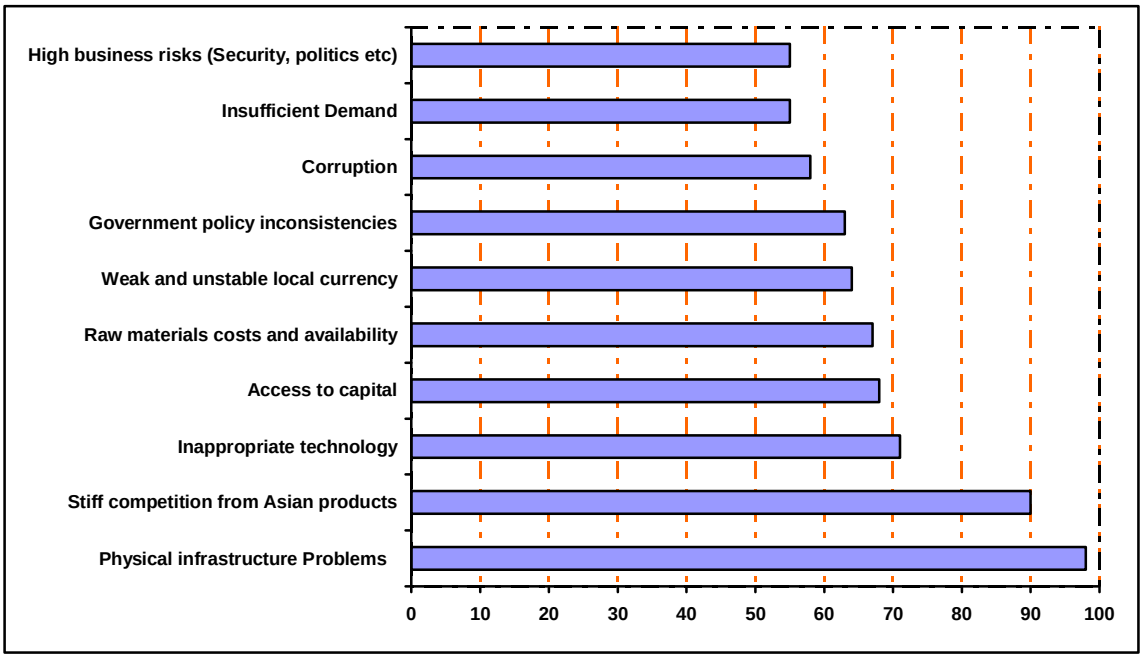
Causes of Manufacturing Firms Failure by Source in Africa.

External	Internal
- Adverse economic conditions - Capital shortage - High interest rates and bank charges - Consumers preference to foreign goods - High minimum wage - Unstable/unfavourable government Regulations and policies - Inadequate/poor infrastructure - Political instability - Stiff Competition from Multinationals - Inadequate patent protection - In adequate technological learning centres	- Management experience - product innovation - Personnel - old and inefficient manufacturing Technology - Succession - Scale (size) of operation - defeat tendencies - The owner takes too much money out of the business to support a personal life style - Over ambitious growth, some times by ill judged acquisitions and some times

Source: Developed by this paper.

Graph 3

Perceived Main Problems Facing the Nigerian Manufacturing Sector as at 2006



Source: Bigsten, A and Soderbom, M., (2006)

Research Design for Investigation of Nigeria Manufacturing Management

U M Mustapha, H Ku* and S Goh

Faculty of Engineering and Surveying,
University of Southern Queensland,
West Street, Toowoomba, 4350, Australia

mustapha@ecnx.net, ku@usq.edu.au*
gohs@usq.edu.au

Abstract. Nigeria is a developing nation in West Africa and the manufacturing management in this nation in the past twenty years has not been well documented. This paper sets out the research design for investigating Nigeria manufacturing management. The project is a combination of 'explanatory and exploratory researches' because it strives to explore the issues related to the Nigerian manufacturing organizations with the help of the existing research studies as well as statistical survey work.

Keywords: Nigerian manufacturing organization, research design, manufacturing management

1 Introduction

This paper describes the methodology upon which the entire research study on the investigation of Nigeria manufacturing management is based. There are different research approaches that are commonly used by the researchers for the attainment of their research purposes, and it is important to select from these research methods the most appropriate suitable research methods in accordance with the topic, objectives of the research and the target respondents. Thus in this paper the different research approaches, purposes and types of expected outcomes are discussed and then the research study is judged on the basis of this description to find out the purpose of the research, what would be the best way to attain this purpose and what would be the nature of the expected outcome of the study. Moreover, the paper explicitly explains the process through which the entire research work is to be conducted including the selection of the sources of information, survey sampling, data gathering, questionnaire construction and result calculation methods.

2 Research Questions

The research study emphasizes the analysis, review and examination of the performance of the Nigerian manufacturing organizations during the last 20 years and there are three factors

selected as performance measures to conduct this examination. These performance measures are 'manufacturing systems (made up of manufacturing strategy, manufacturing process and manufacturing innovation), product design, and environmental uncertainty. Furthermore, this project will present a comparative analysis between a Nigerian manufacturing sector with those of China, India and Malaysia with the intention of finding some ways to improve the performance of the Nigerian manufacturing organizations. It is found that the research study is going to cover a wide topic and for the attainment of the research objectives in a systematic and managed manner. It is therefore necessary to organise the research objectives in terms of different research questions so that the findings of the study can be evaluated on the basis of providing the answers to the main research questions. Principally, this research is aimed at finding the answers to the following research questions which were generated in the literature chapters:

- What are the strategies and policies that can help the underdeveloped countries to cope with the technological advancements in manufacturing?
- What strategies and planning can improve the performance and productivity of the Nigerian manufacturing organizations?
- What was the performance of the Nigerian manufacturing sector from 1999-2009 in terms of product design, manufacturing processes, manufacturing strategy, manufacturing innovations and environmental uncertainty?
- What are the main problems and limitations faced by Nigerian manufacturing organizations?
- What are the factors that have played an important role in undermining manufacturing sector growth in Nigeria?
- What are the main differences in terms of product design, manufacturing processes, manufacturing strategy and manufacturing innovations in the Nigerian manufacturing sector as compared with that of China, India and Malaysia?
- What are the main differences in the growth patterns, strategies and planning of the Nigerian manufacturing sector as compared with that of China, India and Malaysia?
- What are the main differences in the manufacturing sector operating environments between Nigeria and China, India and Malaysia?

3. Research Approach

The research approach employed for conducting the research study

is the ‘mixed methodological approach' and the thesis strives to attain its objectives through the statistical survey and secondary analysis of data. These two research approaches are chosen keeping in view the significance and relevance of these research methods for the study. The research work seeks the answers the eight research questions mentioned in the last section above. A qualitative analysis of secondary data is to be conducted in order to find out the answers to some of the research questions.

Comparative analysis is one of the significant and commonly employed research approaches. Akinlo observed that in order to find some better ways for improvement in the economic performance of a country, it would be a better approach to compare the performance and economic conditions of that country with some developing nations so that the implacable strategies and policies of the developing countries can be identified and implemented to gain economic stability [1]. In this way the growth patterns of one country can help in determining the future path for the development of other countries. This approach is also employed in this research. Along with the secondary data analysis, a statistical survey among 400 Nigerian manufacturing firms involved in the manufacturing of different consumer products is also conducted to gather quantitative information about the topic of the thesis. The views of the Chef Executive Officers (CEOs) and heads of manufacturing operations in the selected organizations will help in pointing out the main obstacles to the development of the manufacturing enterprises and options for improvements. The strategy adopted is that the primary research findings will support the findings of the secondary research in answering the research questions.

4 Research Methodology

There are three important issues that must be clearly understood when formulating any research design and methodology [2]. First of all, the researcher has to decide what would be the purpose of the research, second, what would be the process of conducting the research and third, what would be the outcome of the research. Therefore, before describing the research design, these three issues are discussed in details so that the ‘Purpose, Process and Outcome' of this research are decided.

4.1 Purpose of the Research

When deciding the purpose of a research, types of researches must be understood very clearly so that it can be explained which research type will be most suitable for the research purpose. There

are basically four types of research purposes including “exploratory, descriptive, explanatory and predictive” [3]. These four research types are explained below.

‘Exploratory research' is one of the important methods of conducting research studies. Researchers always give proper attention to this research type in order to find out the answer to their research question. This research type is beneficial for conducting the research study because the main objective of this research type is to collect maximum information related to a specific problem. This research type is selected for uncommon problems or when the available information is not very reliable and absolute [2]. This technique is most suitable for conducting interviews [3]. As identified in the literature review, there are some gaps found in the literature available and this thesis strives to fill those gaps by exploring the issues that are as yet undiscovered.

The second type of research is ‘descriptive research'. The purpose of this type of research is to provide a description of different phenomena related to different individuals, events and situations. The main objective is to build up empirical generalizations. It is commonly used for searching secondary data for the solution to different problem statements. It can be stated that this research type mostly deals with qualitative issues and conducting this type of research study involves the use of both primary data and literature analysis.

The third type of research is ‘explanatory research', which possesses great importance in the context of the scientific researchers because the main purpose of the explanatory studies is to build up precise theory that is utilized to describe the empirical generalizations [2]. Mostly, this type of research is based on empirical studies and tested hypotheses that Explanatory research is also called analytical research, in which the researcher generally goes for description of the characteristics and analysis and explanation of the entire situation to find the reasons behind any incident. This type of research strives to understand and explains the phenomena through the discovery and measurement of the casual relationship between different factors. From these arguments, clearly this project is also an explanatory piece of research as it is aimed at explaining different manufacturing issues in details.

The fourth type of research is ‘predictive research' in which the researchers generally go further in making certain statements and comments by forecasting the likelihood of a similar situation occurring elsewhere [2]. In this type of research, the researcher, mostly gives answers to questions like how, why and where and these questions are related to the future of the subject matter of the

research and the research will provide possibilities considering the findings as to what will happen in case of any occurrence in future. Considering the above explanations and descriptions of the research purposes it is found that this project is meant to be a combination of ‘explanatory and exploratory researches' because it will strive to explore the issues related to the Nigerian manufacturing organizations with the help of the existing research studies as well as statistical survey work.

Process of the Research

After clarifying the purpose of the research the next step is to find out which research process will best suit the purpose of the project. As discussed above, explanatory and exploratory research studies can be conducted by employing both qualitative and quantitative research approaches. For this research study, the mixed methodology is employed and both qualitative and quantitative studies will be conducted to attain the objectives of the research. The mixed methodology is chosen because it is a significant method for conducting different types of research studies. Johnson and Onwuegbuzie observed that “mixed-method kind of research draws upon the strengths of both quantitative and qualitative analysis, which enables the researcher to draw upon several methodologies in measuring the variables of the study” [4]. Qualitative research is a field of enquiry that crosscuts disciplines and subject matters [5]. Qualitative researches are mostly aimed at having deep understanding of different issues, human behaviour and the reasons and factors governing human behaviour [2]. In other words, qualitative research strives to find the answers why and how, rather than just where, when and what. Qualitative research is also meant to be explanatory most of the time rather than just conclusive [6]. While conducting qualitative research, it is common to use different theories, models and hypotheses.

Qualitative research is also regarded by experts as an instrument that can be used for the development of in-depth understanding of any phenomenon that can become the base for quantitative research later on [6]. As identified by Berg, there are many ways of conducting a qualitative research study, including “case study, literature review, natural experiment, participant observation, interview-based, and secondary analysis of data or a combination of these [7]. Each of these strategies has its own advantages and disadvantages depending on the following conditions:

- Type of research questions;
- The investigator’s control over the actual behavioural events;
- Degree of focus on contemporary events.

Along with qualitative research, the project will also employ a quantitative research methodology. Quantitative research is the systematic and scientific investigation of quantitative properties and phenomena and their relationships. It is all about quantifying relationships between variables [7]. The quantitative research methods are most of the time aimed at developing and employing different mathematical models, theories and hypotheses that pertain to the natural phenomena. In quantitative research methods, the measurement and calculation of the result possesses central importance because through the measurement or calculation the fundamental relationship between different empirical and mathematical expressions is established. The quantitative research methods have been commonly used by researchers for many years and through the gathering of quantitative data, the researchers seek for information that is measurable in numbers. Graphs, tables and statistics are usually used for the presentation of the results of these types of research methods and some computer software like Excel and SPSS are commonly used for the calculation of the survey results. The researchers supporting the employment of quantitative research methods believed that through different quantitative methods applied research become scientific in real terms. Quantitative research can also be done in different ways like polls, statistical surveys, etc. This thesis finds that statistical survey will be the most appropriate methods. Thus along with the qualitative study of secondary data, a statistical survey of 400 consumer products manufacturing firms operating in Nigeria will be conducted to find more information related to the research topic. A statistical survey is also one of the important and preferred methods of conducting research studies.

Outcome of the Study

The third important decision regarding the research design is to identify the nature of the expected outcomes of the study. Shaughnessy et al argued that there could be three types of possible outcomes of a research study, including ‘applied, basic or pure and action'. When any part of the research study is conducted with the intention of bringing out the solution of any specific problem then the results or outcome of the research is expected to be applicable, because the outcome will be in the form of some suggestions or decisions that can be used for resolving issues [8].

The second type of outcomes of the research study is called basic or fundamental research. This type of research strives to improve understanding about any general issues while the emphasis of the research does not remain on the immediate applications of the study or any facet of the issue [8]. The outcome of the research is

mostly academic in nature as it adds to the knowledge and literature related to the topic for a general good rather than proposing the solution to any problem [2]. In this type of research study, the outcome might offer some discovery, invention or reflection. While analysing this research study in accordance with the basic research, it is found that this project is not basic research as it is not only aimed at contributing to the existing literature, but it goes further in identifying and proposing the solution to the problem.

The third type of outcomes of the study is action. In this type of research study, action is the outcome of the research as well as part of the research. Researchers attempt to interfere in the environment where the problem exists and work out how to bring changes in the situation. This is a common type of research in the pure science fields because the researchers often have the authority and access to interfere and make changes in the existing situation. This project is not action-oriented because the expected outcomes of the research will not be in the form of practical actions but only suggestions, analysis, review and recommendation.

The above discussion helps in deciding the outcome of the project, and it is finally concluded that the expected outcome of this project will be ‘applied' because the research study will offer some suggestions and recommendations that can help to improve the situation of the manufacturing organizations in Nigeria [8].

5 Conclusions

The paper discussed all the points related to the research methodology employed for conducting the study. In the paper all the decisions regarding the research method are taken and it describes different purposes for conducting the research studies, and it is found that this research is going to be an exploratory and explanatory research. The research strives to find the solution to a problem and at the same time it will also describe and explain several manufacturing issues in detail. It is also explained that the mixed methodology is selected for the research and ‘secondary analysis of data and statistical survey' are selected as the most appropriate research methods for the study, keeping in view the objectives of the research and the relevance of these methods to the research objectives. In the same way, it also becomes clear that the research study will come up with applied results or outcomes because the research will propose some suggestions and recommendations for the improvement of the performance of the Nigerian manufacturing business rather than just describing and explaining the issues.

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Importance of Product Design in the Nigerian Manufacturing Sector

U M Mustapha, S Goh and H Ku
Faculty of Engineering and Surveying, University of Southern Queensland,
West Street, Toowoomba, 4350, Australia

Corresponding Author:
Title : Dr.
Name : Harry Siu-lung Ku
Affiliation : Faculty of Engineering and Surveying, University of Southern Queensland.
Tel. No. : (07) 46 31-2919
Fax. No. : (07) 4631-2526
E-mail : ku@usq.edu.au
Address: Faculty of Engineering and Surveying, University of Southern Queensland,
West Street, Toowoomba, 4350, Australia.

Abstract
Product design has been proved to be a critical factor in influencing and deciding the success of the manufacturing sector. Many research studies conducted have revealed the importance of product design but only few have analyzed the performance of the Nigerian manufacturing sector in terms of product design. The current research is aimed at identifying the importance of product design in the Nigerian manufacturing sector and proposes some recommendations and suggestions to improve the present level of product design in order to reach a reasonable level of competency in the domestic and international market. With the secondary analysis of data revealing the importance of product design as a manufacturing concept, a quantitative statistical survey and a qualitative focus group interview was conducted to analyze the importance of product design in the Nigerian manufacturing sector. A structured questionnaire was sent to 400 manufacturing firms identified from the directorate of Nigerian Manufacturers Association (MAN) for conducting the survey which received 254 responses. To share their views, 10 experts from the manufacturing industry participated in the focus group interview. The results of the research revealed that the manufacturers in Nigeria are showing less focus on product design and the research development work before designing the product which leads to the low level of product design. Further, non-adaptability of advancements in technology and low skills and capabilities of the Nigerian workforce and product designers were also identified as the key factors for the low level of product design in Nigeria. The research recommended that the manufacturing companies in Nigeria should adapt to the advancements in technology, invest on research and development work and focus on training and skill development of their workers to ensure high level of product design and be competitive in the domestic as well as international market. The research also recommended that the Nigerian government should provide necessary financial support for the manufacturers.
Key words: product design, Manufacturing sector, Nigeria, technology

1.0 INTRODUCTION

The performance of the Nigerian manufacturing sector has been significantly low over the last two decades after the world oil price crisis. Many researches have been conducted in identifying the factors responsible for the slow pace of growth and few have focused on the manufacturing concept like product design. With this motivation, this research is aimed at examining and analyzing the importance of product design, as a performance measure, in the Nigerian manufacturing sector. The research is also aimed at recommending methods and policies for improvement so that the manufacturing organizations can play their expected roles, which will improve the country's economy.

2.0 IMPORTANCE OF PRODUCT DESIGN IN MANUFACTURING

Product design possesses an integral position in the entire manufacturing process. Product design is one of the cross-functional and knowledge extensive activities that possess great importance in the highly competitive market place of today (Corswant et al, 2002). The term product design is used to refer to the process that began with the generation of the main idea or concept regarding the product, the development of the idea, its testing and then finally the manufacturing and implementation of that idea in order to give it a physical form of any product or service (Hesselbein et al, 2002). The term product design basically refers to the idea generation and concept development regarding the product and then the manufacturing of the product or implementation of the idea and concept into the physical object that is called the product or service.

In the manufacturing sector, product design has an important role to play and ideally it is considered that the product designers must strive to combine art, science and technology so that in the end they can come up with a tangible product or service that could be a three-dimensional good. The advancements in technology have further broadened the scope of product design as this process is very much facilitated and enhanced due to the advent of modern digital tools through which the designers of the products can communicate, visualize as well as analyze their ideas more quickly. Thus, technological advancement has changed the product design concept as well and the product designers of today are required to be capable of integrating the art, science and technology in fluent ways.

As globalization has contributed to the fast pace of competition, the companies are now striving to attract the consumers through attractive products designs. In almost all of the business organisations, product design is regarded as the key strategic activity because it is a fact that the revenue of a company largely depends upon new product designs (Droge et al, 2000). Social scientists have also highlighted the importance of product design for businesses and it is identified by many of the researchers as one of the most important parts of business planning and strategy.

Koufteros and Jayaram (2005) explained that product design is highly regarded as a factor that has the capability to influence organisational success because it is a critical factor that can set the core characteristics, features, functions and performance level of a product and service according to the demand of consumers. Koufteros (2001) observed that the recent awakening in realization of the critical importance of product design is led by the fact that consumers have now become more demanding and they have a lot of choices and opportunities in front of them to quickly switch over from one product to another due to which there is a shorter life cycle of products that can meet the rapidly changing demands of the consumers.

Dick and Basu (1994) revealed that product design is an important part of manufacturing and for the successful and competitive level of product designing it is necessary that the product designers associated with the manufacturing sector must be well equipped with the skills and capabilities that are essential for designing the products that can generate revenue for the company and can also stabilize the situation. For this purpose, it is necessary that the product designers must possess the ability to manage the design projects and also to subcontract with the areas related to the design industry. Fornell (1992) explains that before thinking about the concepts and ideas for product design it is very important that the people associated with the manufacturing must have a clear idea in their mind whether or not there is a need for the product and what would be the potential usage of the product that they are going to design. The answers to these questions can help them in determining the features of the future product and the finished product will also be in accordance with the needs and demands of the consumers. In other words, it can be said that the product designing must be done on the basis of adequate research work regarding consumer demands and expectations so that the product can attain a good position in the market and can also bring competitive advantages to the company as well as to the entire manufacturing sector.

McDermott et al (2002) clarified that product design has been among the most critical success factors for the businesses for many years, however in recent years the importance of product design has further increased due to globalization and high competition. In this regard, it is necessary that the manufacturing firms must emphasise innovative product designing so that they can increase their revenues. The rising demands of the well aware consumers of today are also giving momentum to the strategic importance of product design. Song and Montoya (2001) revealed that the manufacturing firms striving to earn high revenues and to contribute to the economic growth of the countries must pay proper attention to product design because it draws direct and significant impacts on the critical determinants for success. In the future, the importance of product design will become more critical. In the early days, people used to select products on the basis of price and quality but along with these attributes product design has become another important influential factor and now the manufacturing firms are required to focus on the issues of innovation, full featured products, recyclables, operating life, liability, warrantee and long lasting attributes of the product. Reich and Sasser (1990) pointed out that the manufacturing firms are demanding innovative product designs as technology usage is getting popular. In this situation, the product designers that are capable of giving unique product designs are considered as strategic and valuable assets for the companies as well as for the country, as they can bring many competitive advantages to the company and in the long term the manufacturing sector can support the economic development of the country through their valuable contribution.

Donna et al (2000) revealed that companies operating in the manufacturing sector have now realized the importance of product design as a tool that can bring them a variety of competitive advantages and that is why many of the companies are giving critical importance to product design in their firms so that they can manufacture the products with innovative ideas that cannot only meet the demands of the people but also make their position strong in the market place. Due to this fact, many of the successful companies in the world have recognized product design as a strategic tool and they are concentrating on this issue. In most of the successful manufacturing companies product design is regarded as one of the major parts of their function and these companies are progressing well on the basis of giving this priority to product designing.

Jones and Sasser (1995) highlighted the importance of product design for the success of the manufacturing firms and for this purpose the researchers conducted an empirical study to investigate the relationship between product design, sustainability and good quality production in the manufacturing firms. The results of the study disclosed that product design is among the factors that can contribute towards the high quality of production. However, it also clarified that there are certain other factors that have to be accommodated with effective product design in order to assure the success of the manufacturing process. Among these factors, environmental uncertainty, the skills of the workers and technology usage are the important factors that can work along with product design and in turn the manufacturing firms can come up with high quality production. It is also revealed from the research that the companies associated with the manufacturing must develop awareness about the relationship between these factors so that they can attain high quality production through the effective management of these factors (Jones and Sasser, 1995).

Oliver et al (1997) conducted research into the significance of concentrating upon product designing and revealed that manufacturing companies are facing a great challenge to retain their existing customers as it is necessary for them to gain the loyalty of their existing customers because according to consumer behaviour studies conducted by Martin *et al* (2006), the existing consumers tend to spend more on purchases. Thus, manufacturing firms have to focus upon the demands of the existing consumers with the help of different strategies. In this regard, the companies must understand the importance of product design because consumers want to see new features in the products that can meet their changing demands. Thus, product design is an important tool through which the manufacturing companies can ensure the loyalty of their consumers. So, successful companies are focusing more and more on product design so that they can attract new consumers and retain the existing ones, can continue to maintain their position in the market place and therefore gain competitive advantage through their product designs.

Schneider and Bowen (1999) pointed out that for most of the manufacturing companies it has proved to be a difficult task to capture the new markets if compared with service oriented companies. However, they can easily retain their existing markets if they have clear understanding about the critical importance of product designing to keep their consumers loyal. In this perspective, product design is regarded as a fundamental tool that can bring prosperity and stability to the companies. Management of manufacturing companies are getting more aware of product design, therefore this function is achieving a strategic position in most of the manufacturing firms and if any manufacturing firm neglects the importance of product design, it has little chance of survival. Gerwin and Barrowman (2002) emphasize that product design can bring significant changes in the performance of a business, thus it is necessary that the companies must focus on this issue and realize the importance of product design to improve and stabilize their efficiency and profitability.

Shoemaker and Lewis (1999) conducted a study to understand the importance of product design and disclosed that if the companies effectively manage product design, there are great possibilities to ensure the loyalty of their consumers because the consumers of today look for innovative features in their products. For this, it is necessary for manufacturing companies to research consumer behaviour and then design the product in the light of this consumer research so that their products can successfully meet the expectations of the consumers. In return, the firms stand not merely to gain in profits but can also contribute to the overall performance of

the manufacturing sector. In this way, the economic growth and development of the country will also be affected and the high quality and popularity of the product will ensure the successful operations of the manufacturing firms.

Droge et al (2000) revealed that advancement in technology has brought some revolutionary and conceptual changes in the marketing world and the companies have to deal with their potential and existing consumers in quite a different manner compared with the past. In the new situation, it is crucial for the companies that the design of the products is also an important attribute that can persuade their consumers to stick with their products. In the early days, the marketers and manufacturers supposed that consumer loyalty had little to do with product design but in the advanced world product design counts for a lot in maintaining consumer loyalty, and as a result the companies of today have to focus more and more on product design as one of their major activities. This concentration and focus upon product design assures the success of the manufacturing firm as more work on product design can come up with ideas that can influence the behaviour of the people in a more effective manner and as a result the manufacturing sector will get the benefits through the dynamics of product design (Droge et al, 2000).

Beugelsdijk and Cornet (2002) observed that product design has emerged as an important factor for the various people and organisations related to the manufacturing sector. Consumer goods manufacturing companies in particular now have to focus much more on the designing of their products if they want to ensure the success of their business. The manufacturing industry all over the world is regarded as one of the most challenging as well as exciting and dynamic business fields. Furthermore, the technological advancements pave several new ways for generating and implementing unique ideas of product design due to which the sector has become highly competitive over the last few years. Significant developments in the manufacturing field during the last few decades have raised several question marks over the issue of survival and competitiveness of the manufacturing firms that are not focusing on bringing new ideas and concepts to their product designs. As globalization has enabled companies and manufacturers of all sizes and scales to operate at an international level, so in this situation the companies are also required to respond to the changes occurring in the rapidly changing surroundings and in this regard concentration on unique as well as significant product design can help the companies not only to operate successfully at an international and domestic level but also to take an active role in the growth and development of their countries. Thus, the manufacturing companies have to respond to technological advancements so that the implementation of the latest technologies in manufacturing design can bring them sustainable growth and stability (Beugelsdijk and Cornet, 2002).

Droge et al (2000) explained that due to the emerging importance of innovation in product designing, the manufacturing sector is also searching for the individuals that can give new ideas and concepts to the manufacturing world. The realization of the importance of product design can be seen very clearly from the rising demand of the creative individuals and professionals in the manufacturing sector. The manufacturing firms now look for the motivated specialist who should have an understanding of all the aspects of the manufacturing so that they can integrate with new technology, arts and manufacturing techniques by applying their knowledge in the product design process. In this way, the manufacturing firms are expressing their desire for creative individuals who show great awareness about product design.

Hong and Schniederjans (2000) pointed out that manufacturing organizations all over the world

are now focusing more and more on product design as they have now realized that this strategic activity can increase their sales revenues and can help them compete globally. Product design has a direct effect on the sales revenues of the manufacturing firms because by designing unique and premium products, the companies attain a position by which they can demand high prices for their products on the basis of the innovative design and features of their products and as a result there is generally an improvement in their sales revenues.

McDermott et al (2002) also revealed that product design is one of the critical and most essential activities for manufacturing firms operating in the technology-driven and advanced market place of today. Meyer et al (2001) pointed out that product design is not an entirely new concept in the manufacturing firm but it is the fundamental point of concern for the manufacturing firms for many decades to come. However in the new age, several new concepts are also associated with product design, such as "mass customization, design for manufacturing and assembly, product disposal, quality function deployment, and time-based competition" (Meyer et al, 2001, p 7). These concepts emerged in manufacturing because the firms have to use innovative technologies and techniques in their product designing activities to align their work according to the requirements of the new century. Song and Montoya (2001) explained that quality is an important issue that is attached to product design and the product designers of all types of goods and services have to take care that their product also provides a standardized quality to the consumers.

Many experts also believe that product design has an integral role to play in shaping the quality of a product. In order to ensure the quality of the product through design, it is necessary that the product must be designed with such functions that can ensure success and reliability to the consumer and along with that it is also necessary that the quality of the product must improve along with the improvement in the operating or performance characteristics of the product. Krishnan and Ulrich (2001) pointed out that the manufacturing firms have to focus more on product design as they are required to come up with more products with a shorter life cycle so that after every short period they can offer new products to the consumers and can grab their attention. This is necessary for the firms because due to greater access to different shopping and means of information, the consumers want to have new products in their hands after very short periods and for this it is necessary that the manufacturers also respond to this changed consumer behaviour and can play a role in the growth of their firms.

Product design and development, these days has a direct relationship to the success of any enterprise because consumers patronize products based on the emotional fundamentals such as how they feel after using the product, the looks of the product, the sounds and so on. These considerations may prove an obstacle for entrepreneurs and product designers in their quest to come out with products with unique qualities. Developing and designing products that will command a fair patronage requires that the developer considers how the product is going to satisfy the consumers and make sure that it is very obvious from the first encounter. Products should be beautifully packaged but this does not mean that the quality will be compromised for any reason. Products designed and developed with the consumers in mind are most times the market leaders because the designer must have taken into consideration, the triggers that will touch the emotions of the consumers. Some consumers will stick to a quality product no matter how it is designed while others may go for flashily designed products. Product design and development plays big roles in success strides of businesses and must be considered a big factor. There is need to explore some reasons while consumers patronize certain products and

one should have that in mind while developing or re-designing the next product (Andrew Eze, 2009).

Great product design is essential in today's competitive marketplace. It determines the aesthetic properties of a product, including the color, the shape and indeed, the entire form. Careful design is essential for fuelling a product with the qualities it will take to sell. Given that the decision to purchase is quite often influenced by emotional responses, image is often just as important as productivity in product design. Product design requires the consideration of ergonomics, technology and usability. Ensuring this is carried out appropriately should result in adding value, by differentiating the product from the competition (Dominic Donaldson, 2009).

Thus, the above review of the studies conducted by different researchers during different periods clarified the importance of product design in manufacturing and it become apparent that the manufacturing firms have to give more and more attention towards the designing of their products as this activity can bring them a wide range of advantages and can assist them in stabilizing their position. It is also revealed from the above review of the literature that product design has been given attention in the manufacturing chain for many decades but in the recent years the advancements in technology have further broadened the scope of product design and in order to meet the requirements of highly demanding consumers and a highly competitive market place it is necessary for the manufacturing firms to give strategic and critical importance to product design.

Thus in the light of this review of the literature, it is worth studying product design because of its direct effects on the performance of the manufacturing sector and the economy as whole. In order accomplish the objective of the paper the following research question is answered: *How Important is Product Design in the Nigerian Manufacturing Sector?*

3.0 RESEARCH METHODOLOGY

To understand the importance of product design, a qualitative research in the form of secondary data analysis was conducted which allowed reviewing and examining of the relevant researches and documents. The review of the literature provided enough evidence to prove the importance of product design but proved that there are few studies that had focused in analyzing the performance of the Nigerian manufacturing in terms of product design as a measure of performance. To fill this gap and further analyze the performance of the Nigerian manufacturing sector in terms of product design, a quantitative research in the form of statistical survey was conducted. To conduct this survey, a list of 400 manufacturing firms was identified from the Directorate of Nigerian Manufacturing Association (MAN) which included food, pharmaceuticals, health care, automotive, chemical and petrochemical industries. The survey was conducted with help of a structured questionnaire which had seven open ended questions. The CEOs and the head of the manufacturing departments were contacted for this survey so that the responses received are legitimate and valid. The survey received 254 responses out of the 400 firms identified and the results gathered were calculated and analyzed using statistical software.

To further enhance and refine the research, a qualitative focus group interview was conducted by identifying 10 experts from the manufacturing industry. The experts for the discussion were identified after a series of screening and selected based on their knowledge and experience

which included academic background, number of years spent in manufacturing function, number of countries worked and geographical spread within Nigerian regions including working experience in multiple sub-sectors of the Nigerian manufacturing sector. The interview was conducted with a semi structured questionnaire which had10 questions and further probing questions were asked to keep the discussion in relation to the topic. The experts were asked to present their views on each question and also comment on the responses of other participants.

4.0 RESEARCH FINDINGS

The findings from the literature review helped in preparing the questionnaire for the survey and the focus group interview to ensure that the gaps identified are duly filled. The results of the statistical survey are presented separately for each question separately and also collectively and further clarified with graphical presentations. The individual and collective results of the focus group interview are also explained in detail by matching the results with that of statistical survey and secondary analysis.

4.1 Research Findings from Questionnaire Survey

There are a total of seven questions included in the second section of the questionnaire and the respondents were asked to express their views about the Nigerian manufacturing sector, in terms of product design. The results of these seven questions are presented below:-

Question 1: ***How do you evaluate the skills and technical capabilities of Nigerian labour in the perspective of maintaining high level of product design and quality of the products produced in the Nigerian manufacturing sector?***

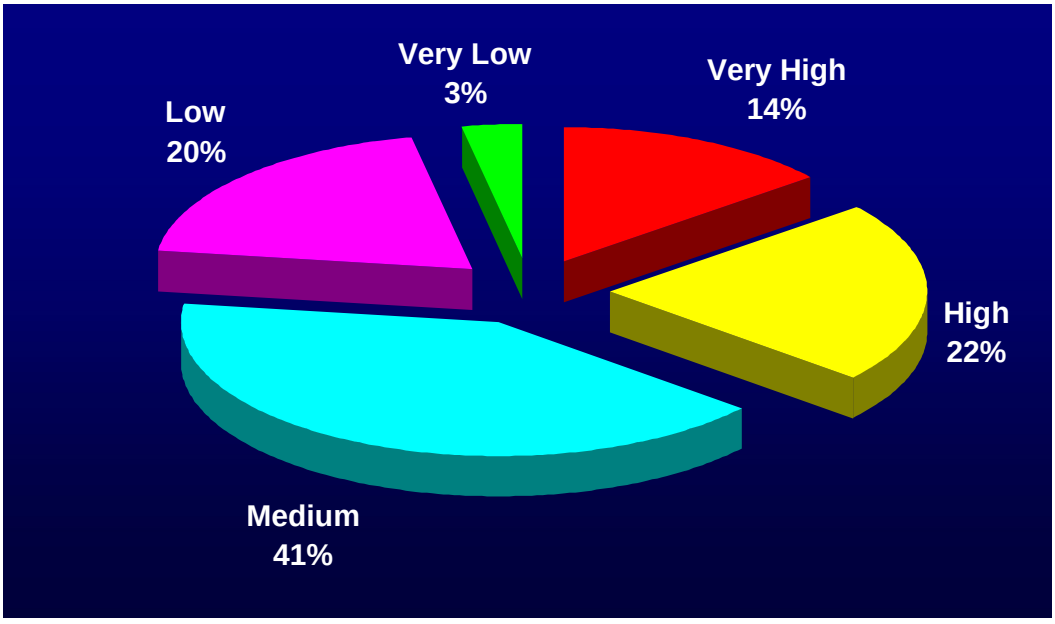


Chart 1: Skills and technical capabilities of Nigerian labour from the perspective of maintaining a high level of product design

The result showed 36 (14%) of the respondents replied Very High, 56 (22%) said High, 104 (41%) said Medium, 50 (20%) said Low and 8 (3%) said Very Low. Thus, the results of the survey

revealed that many of the professionals working in the Nigerian manufacturing organizations regard the skills and technical capabilities of Nigerian workers at the medium level.

Question 2: ***In your view what is the level of Nigerian companies' concentration on product design and is that level enough to improve the performance of the Nigerian manufacturing organizations in terms of high productivity and revenues?***

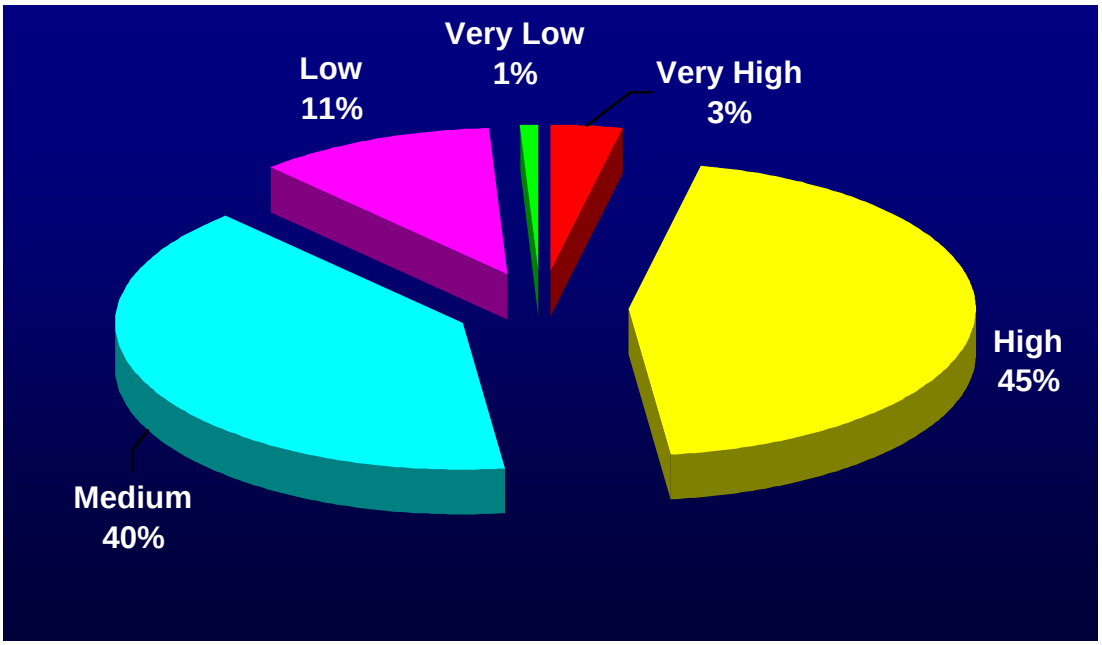


Chart 2: Level of Nigerian companies' concentration on product design in terms of high productivity and revenues

In reply, 8 (3%) of the respondents that replied Very High; 112 (45%) said High, 100 (40%) said Medium, 28 (11%) said Low and 2 (1%) said Very Low. Thus it is found that the respondents of the survey agree that the Nigerian firms are focusing highly on product design.

Question 3: ***How do you evaluate the products designed by Nigerian consumer goods manufacturing companies at an international level?***

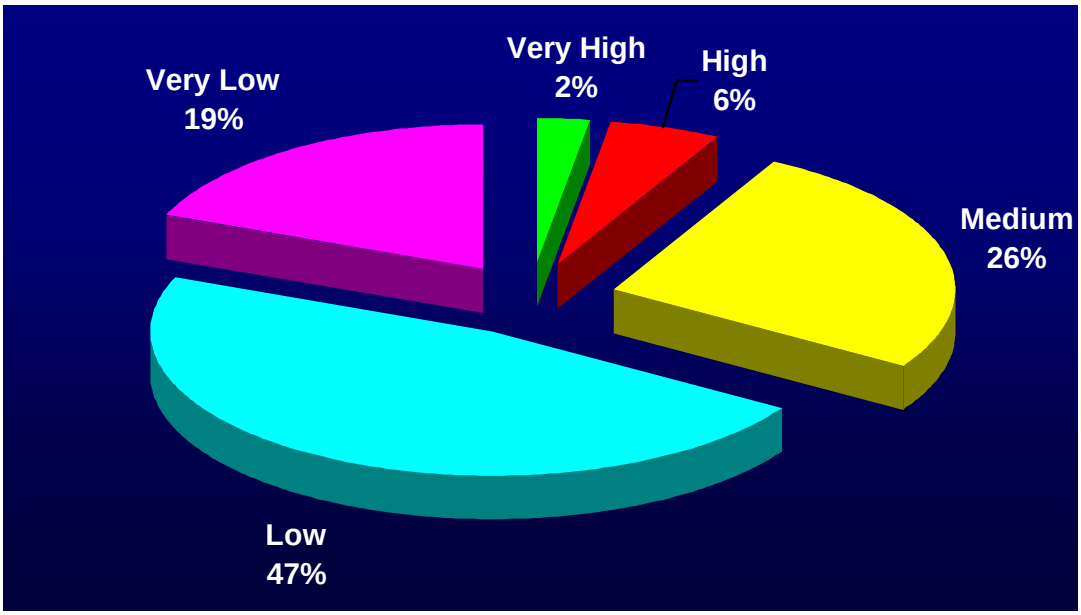


Chart 3: Evaluation of the products designed by Nigerian consumer goods manufacturing companies at an international level

In reply to this question, 6 (2%) of the respondents said Very High, 14 (6%) said High, 66 (26%) said Medium, 120 (47%) said Low and 48 (19%) said Very Low. Thus it is clear from these results that most of the respondents have the opinion that at an international level the product designing of the consumer goods manufacturing sector in Nigeria is at a very low level.

Question 4: ***Whether the Nigerian consumer sectors' product designers have the potential to generate unique and competitive ideas and concepts for product design?***

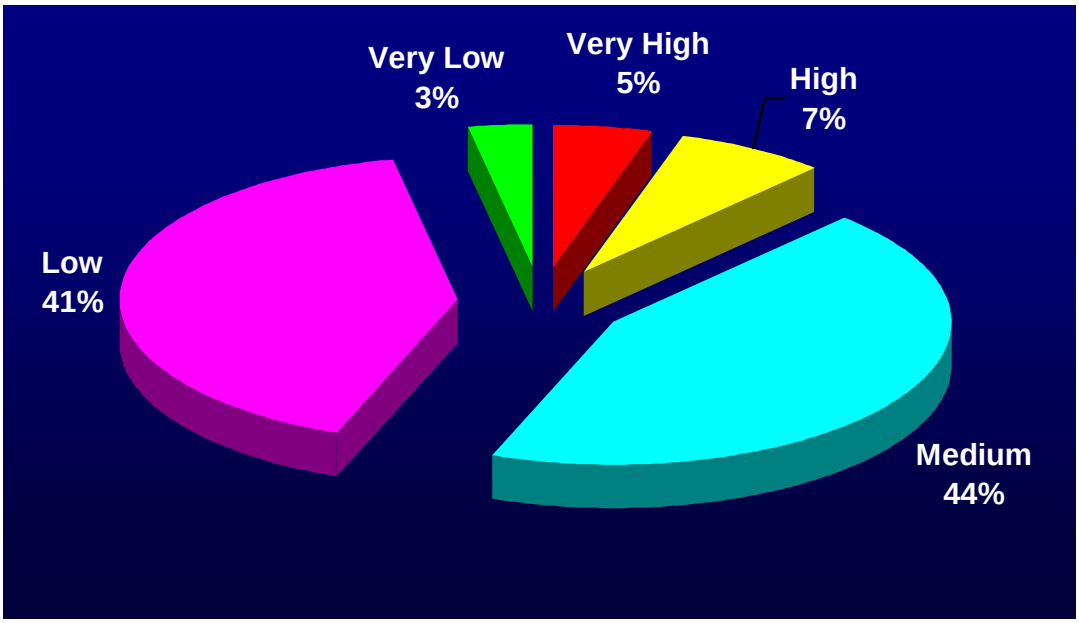


Chart 4: Potential of the Nigerian consumer sectors' product designers to generate unique and competitive ideas and concepts for product design

In reply to this question, 12 (5%) of the respondents said Very High, 18 (7%) said High, 112 (44%) said Medium, 104(41%) said Low and 8 (3%) said Very Low. It is discovered from these results that the respondents of the survey see a very low level of potential in Nigerian product designers to manufacture products with unique and competitive designs.

Question 5: ***What is the trend among the manufacturing companies to do adequate research to determine the demands and expectations of the consumers before the product design process?***

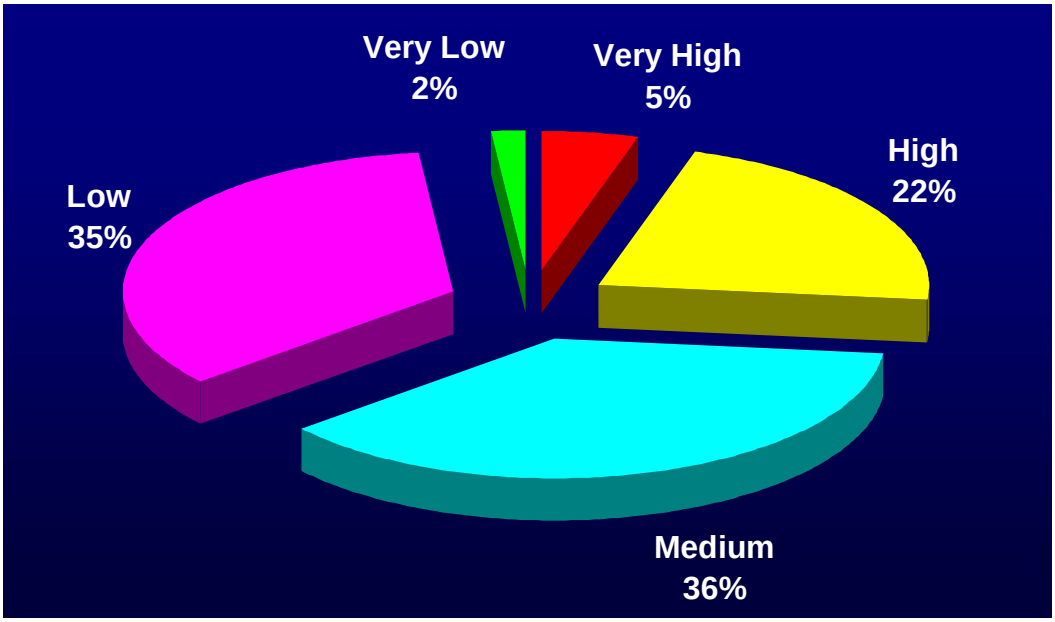


Chart 5: Trend among the manufacturing companies to do adequate research to determine the demands and expectations

The result showed 12 (5%) of the respondents said Very High, 56 (25%) said High, 94 (37%) said Medium, 88 (35%) said Low and 4 (1%) said Very Low. These results show that most of the respondents of the survey believe that the research work trend level is very low among the manufacturing companies of Nigeria.

Question 6: ***How do you see the present product designs of Nigerian consumer products assisting the country to compete at the domestic and global level?***

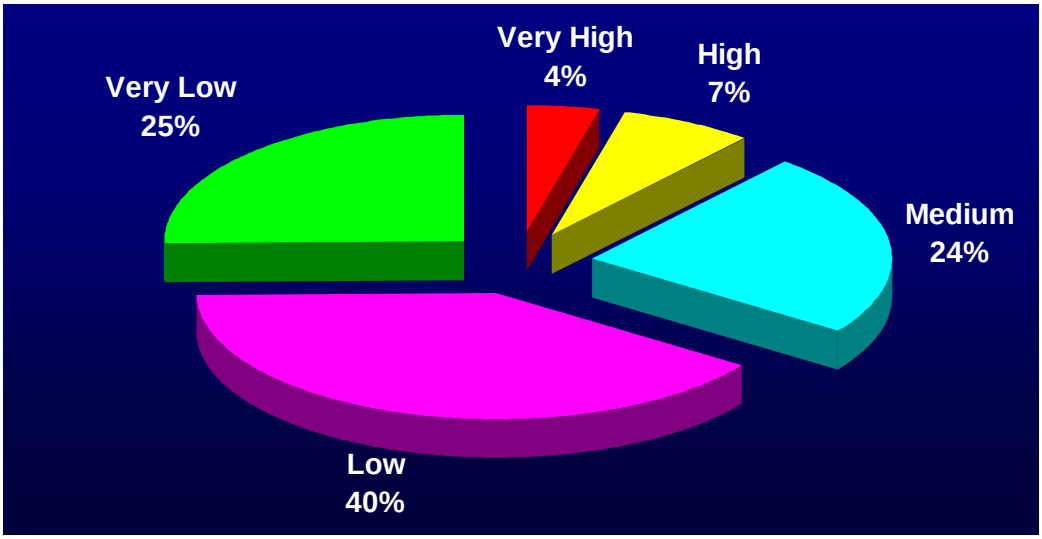


Chart 6: Assistance of present product designs of Nigerian consumer products to compete at the domestic and international level

In reply, 10 (4%) of the respondents replied Very High, 18 (7%) said High, 60 (24%) said Medium, 102 (40%) said Low and 64 (25%) said Very Low. The results show that in the view of the survey respondents the present level of product design is very low in assisting the country in competing with other companies at domestic and international level

Question 7: ***Does the present product design of consumer goods in Nigeria successfully meet the expectations and demands of Nigerian consumers?***

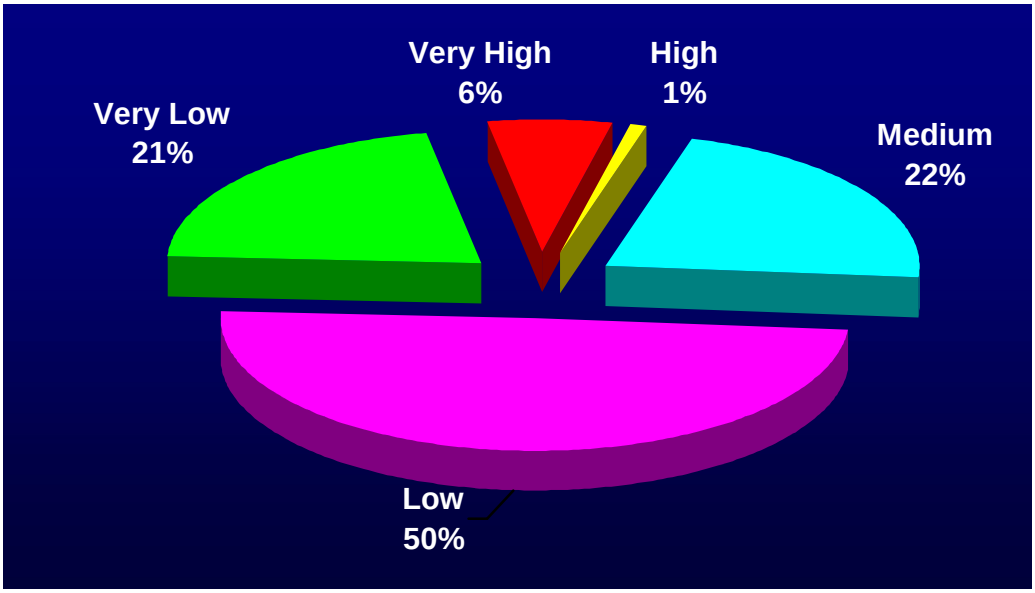
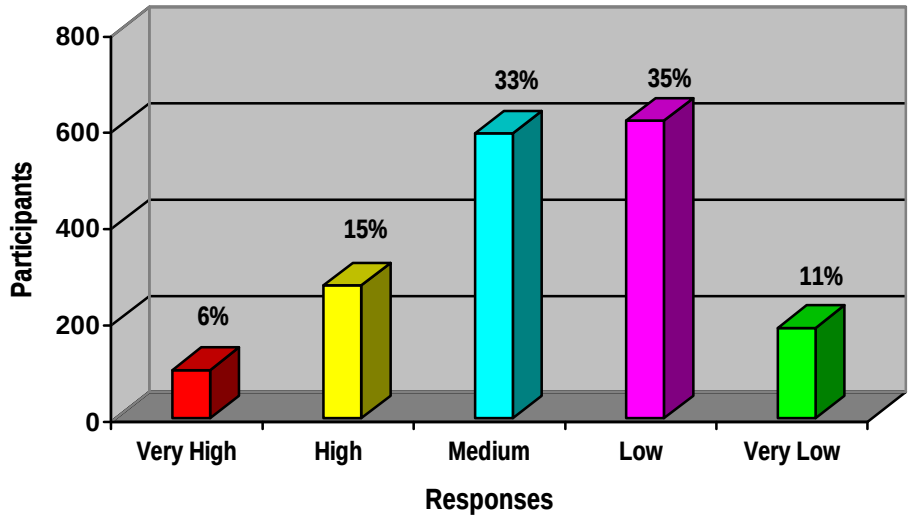


Chart 7: Present product design of consumer goods meeting the expectations and demands of Nigerian consumers

In result, 16 (6%) of the respondents said Very High, 2 (1%) said High, 56 (22%) said Medium, 126 (50%) said Low and 54 (21%) said Very Low. It is revealed from these results that the present product designs of the products manufactured in the Nigerian manufacturing sector are of a very low level to meet the demands and expectations of the consumers.

Combined Result: All the seven questions of this section were calculated separately as well as collectively for getting the overall opinion of the respondents about product designing in the Nigerian manufacturing sector and according to the combined calculation 100 (6%) of the respondents rated the product design of Nigerian manufacturing as very high. According to the opinion of 276 (15%) respondents the level of product design is high, 592 (33%) regarded it medium, 618 (35%) low and 188 (11%) very low.



Graph 1: Overall opinion of the respondents about product designing in the Nigerian manufacturing sector

The collective results of the section also show similar results to the questions and it is found from the questions asked from different aspects that the present level of product designs in consumer goods manufacturing is not satisfying for the professionals working in the same field. They believe that the product design of the Nigerian manufacturing organizations is at a very low level due to which it cannot assist the country to be competitive at both domestic and international levels. Moreover, lack of research and development work among the manufacturing companies of Nigeria is also identified in the results of this section of the questionnaire.

4.2 Research Findings from Focus Group Interview

Question 1: ***Distinguished participants, can you briefly introduce yourselves with special emphasis on your local and international manufacturing experience as it relates to product designing?***

The first question collected details about the participants' work experience in the manufacturing industry in Nigeria as well as in the international market. To maintain confidentiality, the real names of the participants were not disclosed and some codes were used for identification.

Question 2: ***How do you evaluate the skills and technical capabilities of Nigerian labour in the perspective of maintaining high level of product design and quality of the products produced in the Nigerian manufacturing sector?***

The experts were of the view that the skills and technical capabilities of the Nigerian labour are very low to maintain high level of product design in producing quality products. The experts also expressed their dissatisfaction about the Nigerian product designers in coming up with innovative and new designs for the products. They insisted the need for focus in training and skill development for the Nigerian workforce so that they have the capacity handle the modern machinery and enough skills to implement the updated technology.

Question 3: ***To what extent do you rate the performance of the Nigerian manufacturing sector in terms product design?***

The professionals rated the performance of the Nigerian manufacturing sector as medium in terms of product design due to non adaptability towards advancements in technology. They also felt that the Nigerian workforce is not equipped to handle the new tools and techniques as well as the modern machinery. The experts revealed that the manufacturers in Nigeria are not open to adapt to the advancement in technology because of which they are not able to come up with innovative designs to meet the demands and expectations of consumers. They also revealed that the manufacturers are focusing much on research and development work which can help in coming up with unique and attractive product designs.

Question 4: ***How would you compare the products designed by Nigerian manufacturing companies' in terms of quality with similar products of international companies?***

The experts revealed that the quality of products designed by the Nigerian manufacturers is currently not up to the standard. The experts also felt that product design is given prime importance by the manufacturers in developing countries like China, India and Malaysia. In comparison with these countries, the standard of product designs in Nigerian manufacturing sector is very low. The experts sited the example of China, where prime focus is given for the quality of the products manufactured and at the same time at a lower cost. Due to this fact, the consumers in Nigeria prefer foreign products over the locally manufactured products.

Question 5: ***How do you rate consumer sector product designers of Nigeria with regards to the potential to generate unique and competitive ideas and concepts for the product designing?***

Most of the experts expressed their disappointment regarding the potential of the Nigerian product designers and they are not very hopeful that these product designers can bring innovation in the manufacturing sector. They also seem disappointed due to their thinking that the manufacturing companies of Nigeria do little research work before going for the product design of their manufacturing goods. Consumers' demands and expectations are rapidly changing with the advancements in technology. Hence, the manufacturers are required to focus more on doing the necessary research in identifying and addressing the changing need of consumers so that they can come up with new products with attractive designs and also with a shorter life cycle.

Question 6: ***What is the trend among the Nigerian manufacturing companies in carrying out adequate research to determine the demands and expectations of the consumers before they go into product design process?***

According to the experts, the manufacturers in Nigeria are not focusing towards research and development work before arriving at the product designs. The experts from the focus group

interview also expressed that countries like China, India and Malaysia focus on investments in research and development work and work towards innovative ideas to come up with product designs capable of competing in the international market. Due to inadequate research, the Nigerian manufacturers are not able to determine the changing demands and expectations of the consumers. Moreover, the advancements in technology has increased the awareness of the consumers as they get to know the entire variety of products and brands available across the globe because of which they are able to compare the products available locally with that of other countries and choose the one which suits their needs and expectations.

Question 7: ***How do you see the present product designs practice of Nigerian consumer goods in assisting the country to compete at domestic and global level?***

Experts working in the manufacturing sector are not satisfied with the present level of product design attained by the manufacturers of Nigeria because they believe that the product design is not up to international standards. This is mainly due to lack of research before coming up with a product design to identify the change in consumers' expectations. Even they are not sure about the fact that this level of product design will meet the demands and expectations of the domestic consumers. Due to non adaptability of innovations in technology, the Nigerian product designers are not able to come up with innovative product designs. Moreover, the workforce does not possess the necessary skills and knowledge to come up with attractive consumer products to compete in domestic and international market.

Question 8: ***To what extent does the present product design of consumer goods in Nigeria successfully meet the expectations and demands of the Nigerian consumers?***

The present product design of consumer goods does not meet the expectations and demands of the Nigerian consumers. With advancements in technology, the lifestyle and living standards of consumers are also rapidly changing as they are aware of the varieties and features of products available. The manufacturers need to attract the consumers with new products with a shorter life cycle and at a low cost to remain competitive in the market. The Nigerian consumers are not satisfied with the present product designs and hence they prefer foreign products over the locally manufactured consumer goods.

Question 9: ***What factors do you think play the most important role in impeding effective Product design within the Nigerian Manufacturing sector?***

According to the experts less importance to product design, lack of focus towards research and development work before arriving at the product design, lack of adoption to advancements in technologies, lack of skills and capabilities of the workforce and lack of training and workshops for the workers to cope with the technological advancements are the factors which play an important role in impeding the effective product design within the Nigerian manufacturing sector.

Question 10: ***Finally distinguished participants, what are your recommendations and suggestions that the Nigerian manufacturing organizations has to emphasise, which will bring improvement in the overall state of product design concept?***

The experts suggested that Nigerian manufacturing organizations should focus more on product designs to survive in this highly competitive market. There is more need to focus on innovative designs for consumer goods with a shorter life cycle and at a lower cost. They felt that the Nigerian manufacturers should invest more in research and development work so that they can come up with innovative and new product designs to satisfy the demands and expectations of the consumers. The research should focus on the need and the potential usage of the product

and come up with the design to match the expectations of the consumers so that the product can attain a competitive position in the market. They should implement new tools and techniques by adapting to the advancements in technology which will help in the sustainable growth and stability in the market. They stressed the need for training in improving skills and capabilities of Nigerian workforce so that they can cope with the advancements in technology and create innovative product designs to compete in the domestic and international market. The experts also suggested that the manufacturers can bring professionals and experts from the successful manufacturing organizations of other countries through which the existing workforce can gain knowledge of their expertise.

4.3 Discussions of the Research Findings

The results of the secondary analysis of data revealed the importance of product design in the manufacturing organization for its survival in this highly competitive market. The result also revealed that there is a gap in the literature as there are few studies conducted in analyzing the performance of Nigerian manufacturing sector in terms of product design. The findings from the survey revealed that the Nigerian workforce does not possess the necessary skills and technical capabilities to maintain a high level of product design and produce high quality products. Though the experts from the focus group agreed with fact that manufacturers in Nigeria are working towards improving the current level of product designs, they were of the opinion that the Nigerian work force does not posses the necessary skills and capabilities in coping the with technological advancements. The participants of the survey felt that the Nigerian manufacturing companies are not focussing enough on product design and the present level is not of the standard which can help to increase the productivity and revenues. They also felt that the product designs of consumer goods manufactured are not competitive enough to meet the rapidly changing demands of the consumers.

The experts from the focus group interview also expressed their dissatisfaction over the current level of product design offered by the manufacturers in Nigeria. Many of the survey respondents also expressed their disappointment regarding the potential of the Nigerian product designers and they are not very hopeful that these product designers can bring innovation in the manufacturing sector. The participants were of the view that the manufacturers are not focussing enough on research and development before coming up with the product design. The respondents were of the view that the present level of product design of Nigerian consumer goods is not competitive in the international as well as domestic market and hence the consumers prefer foreign products over locally manufactured goods. The experts expressed that product design is given prime importance by the manufacturers in developing countries like China, India and Malaysia. In comparison with these countries, the standard of product designs in Nigerian manufacturing sector is very low.

The experts from the focus group interview also expressed that countries like China, India and Malaysia focus on investments in research and development work and work towards innovative ideas to come up with product designs capable of competing in the international market. They felt that Nigerian manufacturers should focus and invest more on research and development so that they can up with the required product design to meet the demands and expectations of the consumers. Moreover, the low standard of product design from the manufacturing companies in Nigeria has leaded the consumers in preferring foreign products over the locally manufactured goods. The findings of the survey duly filled the literature gap by providing the in depth analysis of the Nigerian manufacturing sector in terms of product design as the measure

of performance. Further, the findings from the focus group interview revealed the present level of product design in the Nigerian manufacturing sector. Thus, matching the results of the primary and secondary research revealed the importance of product design in the Nigerian manufacturing sector. In summary, the findings of the research has fully provided an answered to the research question, which is an attempt to find out the importance of product design and make suggestions on within the Nigerian manufacturing business.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The main objective of the study is to reveal the importance of product design in influencing the success of the organization and present the recommendations for the growth and development of the Nigerian manufacturing sector. The manufacturers should shift their prime focus on product design and should be open to adapt the advancements in technology so that they can create and innovative new product designs. They should implement new tools and techniques and also modern machinery and equipments in enhancing the present level of product design. The manufacturers should come up with new and attractive consumer products with a shorter life cycle so that they can satisfy fast changing needs of the consumers and be competitive in the domestic and international market. For this purpose, the manufacturers should arrange for the necessary training and workshops for the workforce to develop their skills and capabilities so that they can handle the new technology and come up with attractive product designs with their improved knowledge.

The manufacturers should also look at inviting the experts and professionals from the successful manufacturing organizations of other countries to share their knowledge and expertise with the Nigerian workforce. The manufacturers should also focus on research and development before coming up with product design and the research should focus on identifying the need and potential usage of the product which will meet the expectations of the consumers. The Nigerian government should also encourage foreign investors and provide necessary financial support to the manufacturers so that they can invest in updating the technology. The Nigerian government and public, private and multinational organizations should support and fund the academic research and development work by the universities and institutions, which will help in improving the current level of product design to attain a sustainable growth and development in the manufacturing sector.

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Are Nigerian Manufacturing Enterprises Competitive Enough in Terms of Their Manufacturing Process?

U M Mustapha, S Goh and H Ku
Faculty of Engineering and Surveying, University of Southern Queensland,
West Street, Toowoomba, 4350, Australia

Corresponding Author:
Title : Dr.
Name : Harry Siu-lung Ku
Affiliation : Faculty of Engineering and Surveying, University of Southern Queensland.
Tel. No. : (07) 46 31-2919
Fax. No. : (07) 4631-2526
E-mail : ku@usq.edu.au
Address: Faculty of Engineering and Surveying, University of Southern Queensland,
West Street, Toowoomba, 4350, Australia.

Abstract
Manufacturing process is a critical factor in determining the success of a manufacturing organization. Nigerian manufacturing sector has been showing poor performance over past two decades. This paper is aimed at identifying whether the Nigerian manufacturing organizations are competitive enough in terms of their manufacturing process. A quantitative questionnaire survey with 258 manufacturing firms and a qualitative focus group interview with 10 manufacturing experts were conducted. The results of the findings revealed that non-adaptability to advancements in technology, lack of skilled workforce and lack of finance are the key factors affecting the manufacturing process. The research recommended that Nigerian manufacturing firms should focus on reforming their manufacturing process by adapting new technology and improving the skills of their labour so that they are competitive in the domestic and international market.

Key words: Manufacturing Process, Nigeria Manufacturing sector**,** Just-In-Time Manufacturing and Lean Manufacturing.

1.0 INTRODUCTION

Advancements in technology and rise in competition has forced the manufacturing organizations across the globe to adapt certain manufacturing philosophies and focus more on their manufacturing systems so that they can improve and align their manufacturing process to the international standards and compete globally. The Nigerian manufacturing organizations are performing at a very slow pace owing to various internal and external factors. The purpose of this research is to identify whether the manufacturing organizations are competitive enough in terms of the specific performance measure – manufacturing process, with Nigeria as an example. The research is also aimed at proposing possible suggestions and remedial measures so that the Nigerian manufacturing organizations can reach a reasonable level of growth and compete at the domestic and international levels.

2.0 IMPORTANCE OF MANUFACTURING PROCESS TO MANUFACTURING COMPETITIVENESS

Manufacturing process is the name given to the phases that a product usually passes through in order to take the form of a finished and final product. It is regarded that an ideal manufacturing system must provide benefits of highly automated and controlled systems and at the same time the production system should also ensure accuracy, mass production, uniqueness of product, and benefits of versatile and adjustable systems (Wu, 1994). Manufacturing process is an integral part of the entire manufacturing sector and an important measure of evaluating the performance of manufacturing sector (Hogan, 2000).

Kelley (1998) explains the critical importance of manufacturing process or system that within a manufacturing sector there are different phases that must be planned, implemented and controlled in an organised manner to assure the success of the entire manufacturing process. Thus in order to improve the performance of a manufacturing sector it is an essential requirement to improve the manufacturing process/system by employing different strategies in different areas of the manufacturing process. Fryman (2002) pointed out that in modern times some manufacturing philosophies are attached to the manufacturing process including the TQM, JIT Manufacturing, Lean Manufacturing and CIM. These philosophies have brought many improvements in the manufacturing sector's performance all over the world especially in the developed and developing countries. Koenig (1994) revealed that the rising competition at domestic and international levels is compelling the manufacturing sectors of different countries to focus more on their manufacturing systems (manufacturing strategy, manufacturing process and innovation) so that they can improve and align their manufacturing process with the global standards and can attain a sustainable level of economic growth and also compete with other sectors at a global level. The importance of the manufacturing process has been recognized by experts as well as by researchers (Wakil, 1998; Hogan, 2000; DeGarmo et al, 1997) for many years, and along with the passage of time and advent of new technologies there are certain new phenomena and concepts that have come along in the manufacturing process and become part of the manufacturing sector. Thus it is necessary to understand the core issues related to the manufacturing process so that its importance for the manufacturing sector becomes clear. In this regard the following literature review aims to discuss the issues associated with the manufacturing process in depth to explain its importance and significance for studying the performance of the manufacturing sector.

Fryman (2002) explains the basic concept and importance of the manufacturing process that almost each and every manufacturing system has to undergo certain phases and it is necessary for successful manufacturing of the products that all of these phases must be planned well. In

this regard the manufacturing management personnel play a crucial role as they have the responsibility to implement the management's planning, manufacturing strategy and to control the entire process of manufacturing to ensure that the manufacturing system works in the desired manner. These personnel must be trained and competent enough to perform this function in better ways. The researcher further explains that in different phases of the manufacturing process, the management has to adopt the policies and strategies as the situation warrants. For example during the planning phases, the management has to look towards several critical issues, among them searching and identifying the potential market for the product. Moreover in the planning phase of the manufacturing process, the manufacturing management experts also have to take major decisions regarding the product design, the process for the manufacturing of the products, facilities and equipment that will be needed in the manufacturing of the product and the required raw material and allocation of other resources.

After the planning phase, the manufacturing system moves towards the next phase, implementation. During this phase, the management has the responsibility to assure the availability of all the required resources, labour, material and facilities for manufacturing and all of these things are put together and provided to the manufacturing company in one place so that the actual process of manufacturing could be started. The implementation phase is followed by the controlling phase that requires the control of the management over the flow of resources and the entire manufacturing process. In the controlling phase it is necessary that the management must monitor each aspect of manufacturing and ensure the success of the manufacturing process by maintaining the desired quality and standard within the given time. All of these three phases are identified as the integral parts of the manufacturing process and it is revealed by the researcher that the management of the manufacturing sector must have awareness about the sensitivity and importance of each and every phase so that they can successfully complete the manufacturing process.

DeGarmo et al (1997) identified that the manufacturing process is also about manufacturing a product through different stages and during each and every stage the management of the manufacturing firm must make such arrangements as can work for the success of each phase within the estimated time. At the same time management also has to keep in view that the required standard and quality of manufacturing is also attained throughout the different stages of the manufacturing process. It is further explained by the researchers that the manufacturing process or system never ends with the manufacturing of a product at one time but it is necessary that the management of the company continuously looks for ways to improve their product manufacturing. The improvement in the manufacturing process is very important because the demands and requirements of the consumers as well as the market place change very quickly and along with the passage of time the manufacturing firms also have to respond towards these changes by making some changes in their product design and process. This change must be supported by the ongoing process of improvement that should be an integral part of the manufacturing system as it assures the success of the products at domestic and international levels. In the same way the improvement in the manufacturing process also prepares the background for successful operations of the manufacturing firm for a long period.

Hogan (2000) observed that the manufacturing process is necessarily conducted with great planning and control and for this it is crucial that the manufacturing system must hire the services of competent technical experts who have relevant qualifications and experience to

handle the entire manufacturing system right from beginning to end. It is necessary for the proper and smooth flow of the production process that the people engaged and involved in the manufacturing process must have deep understanding of the technicalities and requirements of the manufacturing process. In this way the manufacturing company cannot just continue to achieve a good standard of manufacturing but can also be sure of being competitive at different levels. Kelley (1998) pointed out that there are different areas of working within a manufacturing system and the management of the manufacturing company or sector must pay proper attention towards each and every phase and area of the manufacturing process.

This attention should be given not only to conducting each phase on time and to the required quality but also to review the process and to find out the areas where the management need to take some steps for the improvement of the manufacturing process. The researcher further explains that the requirement of continuous improvement is attached to the manufacturing process as the improvement in the manufacturing system is also regarded as the integral and initially required part of the manufacturing system. It is also important to note that the decisions of the management regarding the need for improvement play a vital role in the success of the manufacturing process. If the management succeed in identifying the right areas where there is a really critical need to make changes, then the manufacturing system can progress in the right direction but if the management ignores any area or phase of the production process then there are great possibilities that the manufacturing system will contain some flaws and the final products will also lack some features or quality due to the negligence of the management.

Wright (2001) explained that it is very important that the manufacturing process is understood by the management and supervisors of the manufacturing firms because the success of the manufacturing company depends on how fluently and smoothly the product goes through the different stages to the final product. In fact the survival of the manufacturing sector also depends upon the success of the manufacturing process. Obi (1999) pointed out that during the 1990s some new concepts and phenomena were introduced into the manufacturing industry that gave new meanings to the manufacturing system and as a result the manufacturing process changed radically in a few decades. It is very important that the manufacturing firms prioritise the implementation and inclusion of new concepts and phenomena in their manufacturing system because through this they can accelerate the economic growth of the country by making a positive and valuable contribution to production and revenue.

Seymour (1995) pointed out that the need to build the manufacturing system on a sound basis is the basic requirement for the survival of the manufacturing sector. In the stiff global and domestic competitive market place the manufacturing companies are required to thoroughly review and analyze their manufacturing system so that they can quickly point out the areas where there is need for making changes or where the manufacturing system requires updating on the basis of the changes occurring in the surrounding world. Koenig (1994) explains that the manufacturing system or process is a wide activity or system and there are certain areas within it that require the continuous attention of the management. In this regard there are four important areas where the management has to keenly focus to find out the requirements for making changes and improvement according to the requirement of the situation. These areas include Equipment and facilities, Material handling, Production methods and Labour. If the management succeed in reviewing and analyzing the performance of their manufacturing system on the basis of these four areas then there is a good chance that the entire manufacturing system will progress in a positive direction and at the end the company will

benefit in terms of the success of the manufacturing process that gives stability to the business and will contribute to the economic development of the entire sector and country as well.

Schey (2000) observed that the manufacturing system of the modern era ought to be different from the traditional manufacturing system as the entire manufacturing process is done in a different way through the employment of new machinery, tools and techniques. Thus it is necessary for the companies to keep their manufacturing system updated with advancements in the technology so that they can continue to take advantages of the advent and emergence of new techniques within the manufacturing industry. Thus it is proved from the above review of the literature that the manufacturing process should be understood very clearly before reviewing the performance of any manufacturing sector because the manufacturing process adopted by a manufacturing sector lays the foundation for the success or failure of the entire manufacturing industry. In this regard it is essential to understand that the evaluation of the manufacturing sector performance must be based on its manufacturing process because the updating and improvement of the manufacturing process is an important issue that plays a significant role in determining the success of the manufacturing sector. It is also explained in the above discussion that the evaluation of the manufacturing system is necessary for examining the performance of any manufacturing system because the manufacturing system or process adopted by the manufacturing sector shows its willingness and responsiveness towards the changes occurring in the surroundings and that the manufacturing sector is changing according to the requirements of the situation.

A report from Deloitte's Global Manufacturing Industry group and the U.S. Council on Competitiveness indicates that access to talented workers capable of supporting innovation is the key factor driving global competitiveness at manufacturing companies—well ahead of "classic" factors typically associated with competitive manufacturing, such as labour, materials, and energy A strong manufacturing sector is a crucial component of a country's intellectual capital, innovation capacity, and economic prosperity. In today's environment, manufacturing competitiveness is driven by an empowered talent base, especially as manufacturers around the world integrate technology platforms and interfaces into their products (Quigley, 2010). At its broadest level, the study confirms that the global competitive landscape for manufacturing is undergoing a transformational shift that will reshape the drivers of economic growth, high-value job creation, national prosperity, and national security (Deborah, 2010). Thus in the light of this review of the literature, it is worth studying manufacturing process because of its direct effects on the performance of the manufacturing sector and the economy as whole. In order accomplish the objective of the paper the following research question is answered: *Are Nigerian manufacturing enterprises competitive enough in terms of their manufacturing process?*

3.0 RESEARCH METHODOLOGY

To accomplish the objective, a mixed methodological approach was employed in the proposed research which comprises of secondary analysis of data, statistical questionnaire survey and focus group interview. Information was gathered from various sources such journals, books and web portals to review the literature and conduct the analysis of the secondary data. The statistical survey was conducted with the help of a structured questionnaire. For the survey, a list of 400 manufacturing organizations was identified from the directorate of the Manufacturers Association of Nigerian (MAN), which were disproportionately concentrated in western, eastern and northern regions of Nigeria. The list of companies identified was from various industries such as food, pharmaceuticals, health care, automotive parts, chemical and

petrochemical industries. The companies were identified based on the criteria that they must have been established before 2002 and which has strength of more than 50 employees. The CEOs and the head of manufacturing departments were contacted for the survey to gather their views through the questionnaire so that the respondents are in authoritative position to answer the survey questions. At the end a total of 258 valid respondents were received and analysed.

The focus group interview was conducted by identifying 10 experts from the manufacturing industry. The participants for the focus group interview were identified based on their knowledge and work experience after a series of screening. The experts identified had varied manufacturing experience such as footwear, pharmaceutical, automotive, petrochemical and even faculties from Nigerian universities. To protect the personal interest and maintain confidentiality, the original names of the participants were covered and identified using some codes. The participants were allowed to answer the questions based on their experience and further probing questions were asked to ensure that the discussion in line with the topic of research. Moreover, the participants were made to comment on the views expressed by other respondents.

4.0 RESEARCH FINDINGS

The secondary analysis of data highlighted the importance of manufacturing process and created the basis for analyzing the research findings. The responses from the questionnaire are calculated separately for each question and then collectively and the results are presented using charts and graphs. Moreover, the experts comments from the focus group interview is also presented in detail.

4.1 Research Findings from the Questionnaire Survey

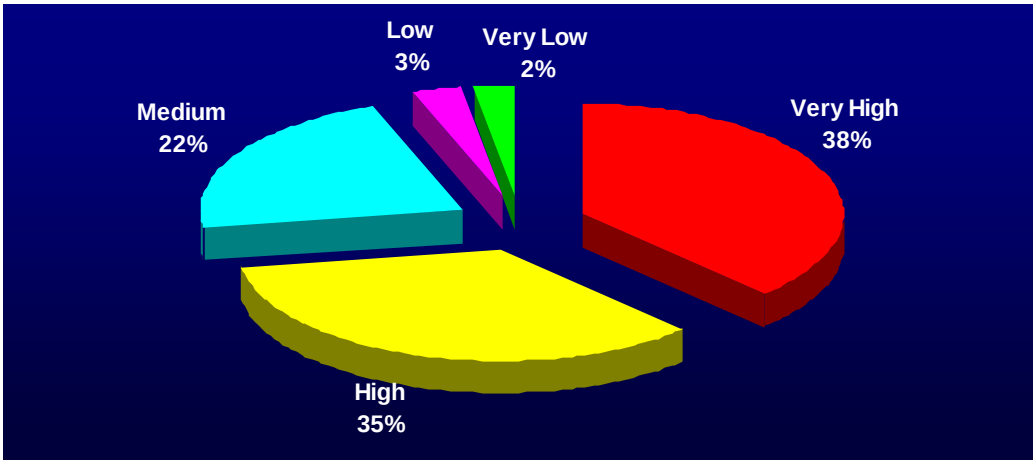
There are in total seven questions in the second section of the questionnaire. The respondents were asked in this section to express their views about the manufacturing process employed in the Nigerian manufacturing Organizations. These seven questions came up with the following results.

Question 1: ***To what level do you think that Nigerian government policies including structural adjustment programmes (SAP) induced high cost of imported machinery and raw materials in terms of growth and productivity in Nigerian manufacturing firms?***

In response, 96 (38%) of the respondents said Very High, 88 (35%) said High, 56 (22%) said Medium, 8 (3%) said Low and 6 (2%) said Very Low. The results of the question indicated that the respondents of the survey share the common view that the SAP induced reforms have proved not to be supportive for the growth and development of the manufacturing sector in Nigeria. The result is also shown in chart 1.

Chart 1

Impact of SAP on the Growth and High Productivity of the Nigerian Manufacturing Sector

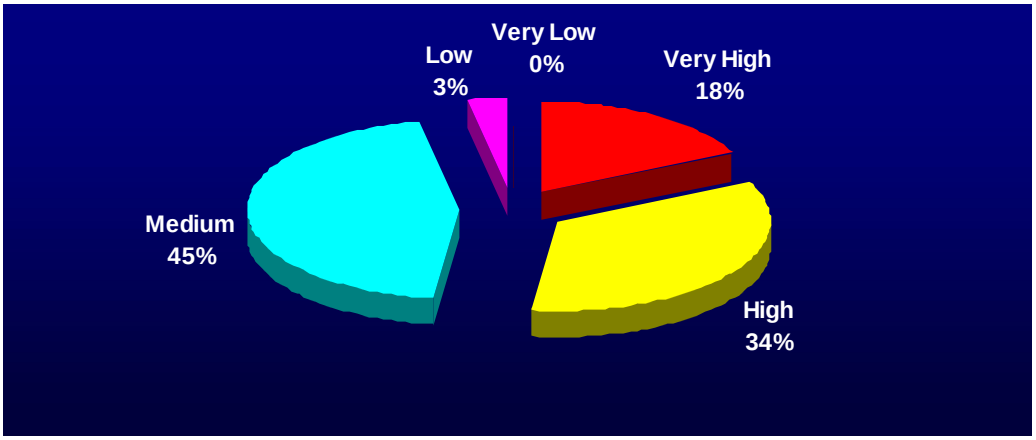


Question 2: ***To what extent do you see the need for training and skill development programmes for workers of Nigerian manufacturing companies to enable them adopt high level manufacturing process?***

In reply, 46 (18%) of the respondents replied Very High, 88 (34%) said High, 116 (45%) said Medium,8 (3%) said Low and 0 (0%) said Very Low. The results show that the professionals working in the manufacturing sector feel that there is a medium level need for training and skill development of the workers engaged in the manufacturing of the products. The result is also shown in chart 2.

Chart 2

Need of Training and Skill Developments for the Workers of the Nigerian Manufacturing Companies

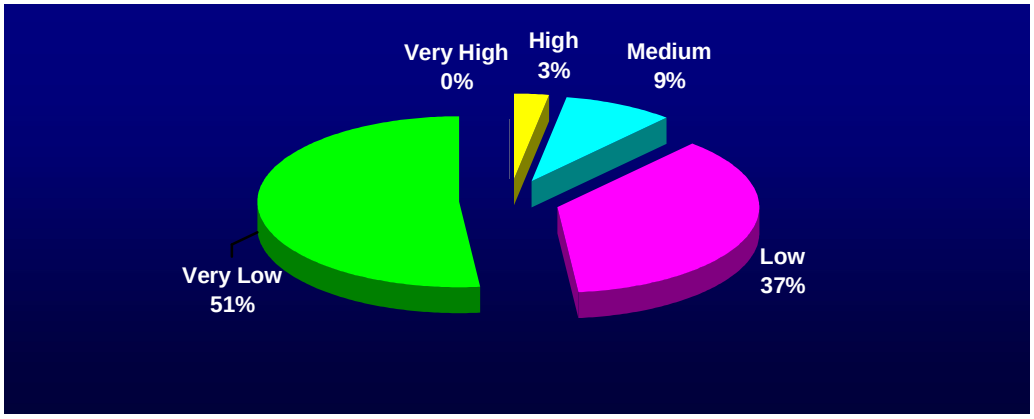


Question 3: ***To what level are Nigerian Manufacturing companies adopting new machinery and methodology within their manufacturing processes?***

In response, 0 (0%) of the respondents said Very High, 6 (3%) said High, 20 (9%) said Medium, 82 (37%) said Low and 116 (51%) said Very Low. According to the respondents, Nigerian firms are preceding at a very low level in adopting the new technology and machinery in their manufacturing process. The result is also shown in chart 3.

Chart 3

Level of Adoption to New Machinery and Methodology by the Nigerian Manufacturing Firms

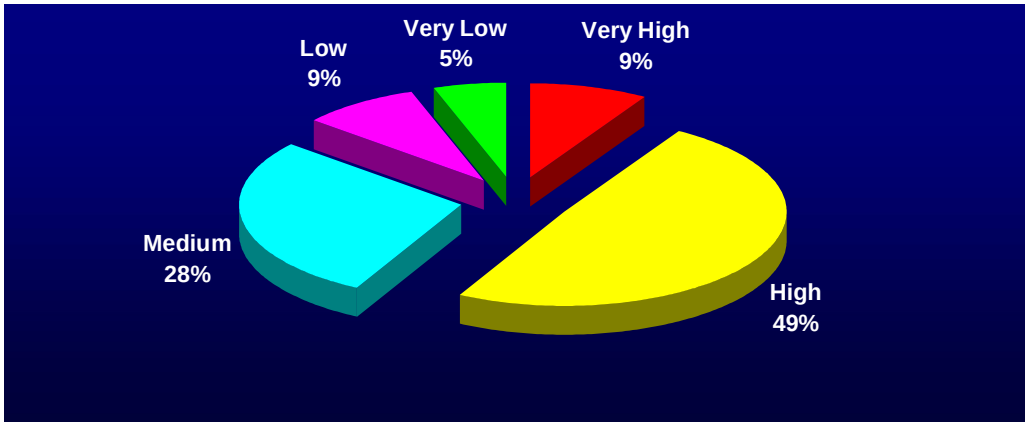


Question 4: ***To what level is the Nigerian Manufacturing sector well-equipped with the skills needed to adopt international modern manufacturing processes?***

In response, 20 (9%) of the respondents said Very High, 114 (49%) said High, 66 (28%) said Medium, 20 (9%) said Low and 12 (5%) said Very Low. It shows that the professionals working in the Nigerian manufacturing sector see the skills of the sector at a high level and capable of conducting international standard manufacturing. The result is also shown in chart 4.

Chart 4:

Skills of Nigerian Manufacturing Sector to Conduct International Level Manufacturing Processes

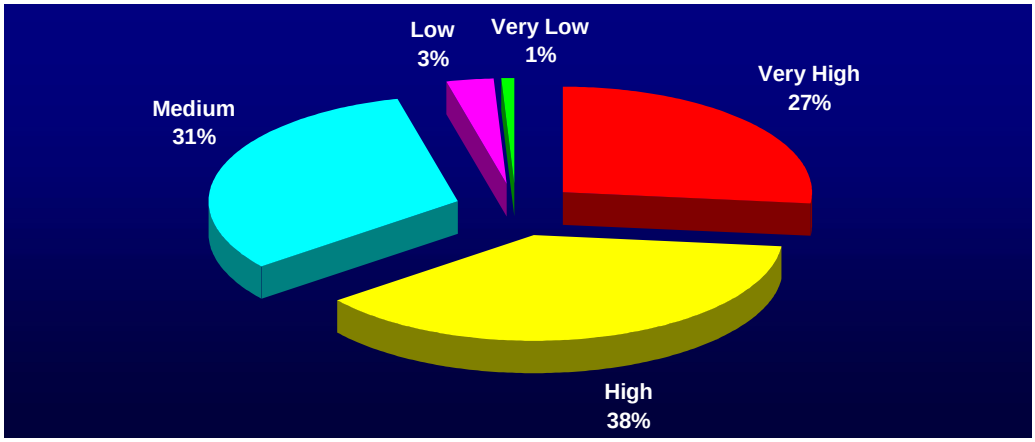


Question 5: ***To what extent is the need to restructure the manufacturing process of Nigerian firms towards focusing on remanufacturing?***

In reply, 68 (27%) of the respondents said Very High, 96 (38%) said High, 80 (31%) said Medium, 8 (3%) said Low and 2 (1%) said Very Low. The results indicate that most participants feel the need to restructure the manufacturing process of Nigerian companies at a high level. The result is also shown in chart 5.

Chart 5:

Need For Restructuring the Manufacturing Process of Nigerian Firms

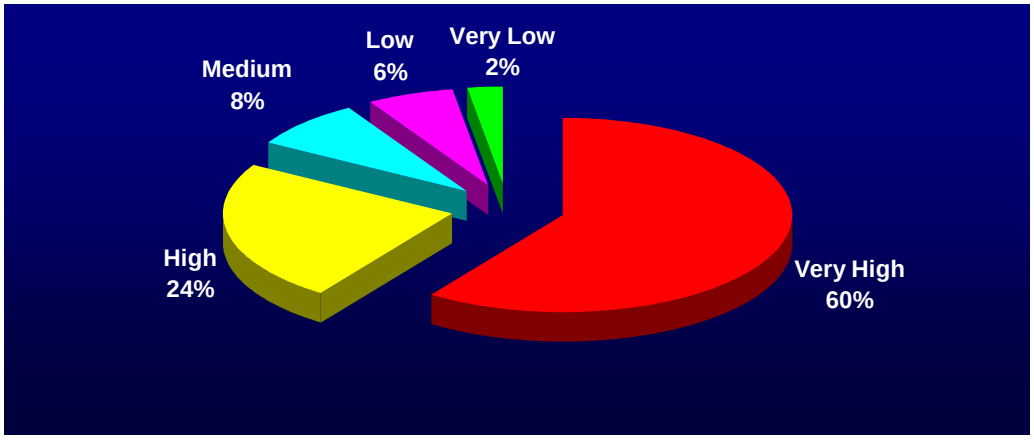


Question 6: ***To what level is the technical know-how and machinery availability affecting the performance of the Nigerian manufacturing companies?***

In reply, 152 (60%) of the respondents replied Very High, 60 (24%) said High, 20 (8%) said Medium, 16 (6%) said Low and 6 (2%) said Very Low. It is discovered from the results that technical knowledge affects the performance of the manufacturing process up to a very high level in Nigeria. The result is also shown in chart 6.

Chart 6:

Effect of Technical Know-How and Machinery Availability on the Performance of Nigerian Manufacturing Sector

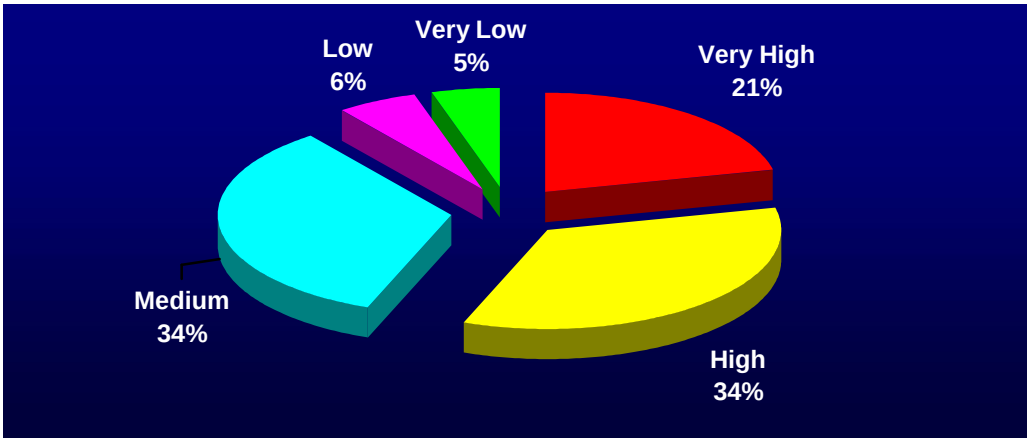


Question 7: ***To what level do you think the Nigerian manufacturing firms should focus on the issues of chain, lean and agile manufacturing concepts?***

In reply, 54 (21%) of the respondents said Very High, 87 (34%) said High, 87 (34%) said Medium, 14 (6%) said Low and 12 (5%) said Very Low. The results show that the above mentioned issues are considered very important by the participants of the survey. The result is also shown in chart 7.

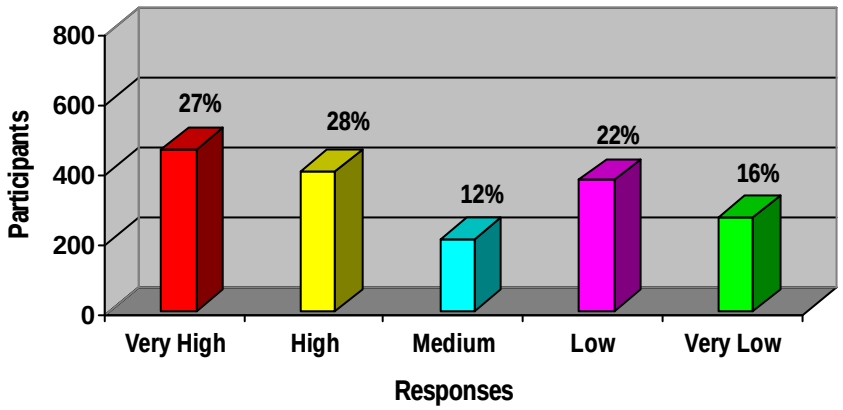
Chart 7:

Focus Needed by the Nigerian Manufacturing Firms on Chain, Lean and Agile Manufacturing



Section Five - Combined result: All seven questions of this section were calculated separately as well as combined to get the overall opinion of the respondents about the manufacturing process followed in the Nigerian manufacturing firms. According to the combined calculation 466 (27%) of the respondents rated the manufacturing process followed by the companies operating in Nigerian as very high. According to the opinion of 402 (28%) respondents the manufacturing process level is high, 208 (12%) regarded it as medium, 376 (22%) low and 272 (16%) very low. The result is also shown in graph 8.

Graph 8:
Overall Opinion of Respondents about Manufacturing Processes in the Nigerian



The combined results show that the participants of the survey have a strong belief that the SAP reforms have affected the growth of the Nigerian manufacturing sector and there is a need for restructuring the manufacturing process as well as to concentrate on certain important issues like chain, lean and agile manufacturing to get in a strong position. In this section the participants also expressed their view that skills and technical equipment affect the performance of the manufacturing in Nigeria at a high level, however the sector possesses the capabilities to adopt the new technology and work at an international standard.

4.2 Research Findings from the Focus Group Interview

Question 1: ***Distinguished participants, can you briefly introduce yourselves with special emphasis on your local and international manufacturing experience as it relates to manufacturing process and its competitiveness and challenges in the Nigerian Manufacturing sector?***

The original names of the experts were covered and some codes were provided to identify them in order to protect their personal interest and maintain confidentiality. The experts provided their details of manufacturing work experience in Nigeria and other international locations.

Question 2: ***To what level do you think that Nigerian government policies including structural adjustment programmes (SAP) induced high cost of imported machinery and raw materials in terms of growth and competitiveness of Nigerian manufacturing firms?***

According to the experts, the structural adjustment programmes was a disappointment as it further declined the performance of Nigerian manufacturing sector. Introduction of SAP forced the manufacturers to pay more attention for the import of raw materials and spare parts for the high cost imported machinery which resulted in very high cost of production. Due to this high production cost, the products manufactured in Nigeria were highly priced and were not competitive in the domestic as well as international market. Moreover, the manufacturers were forced to spend the available finance in procurement of raw materials and spare parts and were not able to invest and update technology.

Question 3: ***To what extent do you see the need for training and skill development programmes for workers of Nigerian manufacturing companies to enable them adopt high level manufacturing process?***

The capacity of the Nigerian workforce is not up to the required level where they can operate an advanced and modern technology based manufacturing process as they do not possess the necessary skills and knowledge to handle the new tools and techniques. Hence, the manufacturers also refrained from introducing those modern machinery and tools. Therefore, there is a dire need for training and skill development of the Nigerian workforce which will help them in handling the modern machinery and advanced manufacturing process and be competitive in the manufacturing industry.

Question 4: ***To what level is Nigerian manufacturing companies adopting new machinery and methodology within their manufacturing processes?***

The experts felt that the Nigerian manufacturers are not open to adopting new machinery and methodology within their manufacturing process as they are aware of the fact that the current workforce does not possess the required skills and knowledge to handle the new tools and techniques of manufacturing. Moreover, those manufacturers who adapted new machinery are facing the problem of very high production cost as they had to pay more importing the raw materials and spare parts for the imported machinery in maintaining them. The manufactures are wasting a lot of money in importing raw materials and spare parts which are highly priced. The manufacturers are in need to adapt the latest technology and bring modern machinery and techniques within their manufacturing process so that the companies can compete in the domestic as well as international markets.

Question 5: ***To what level is the Nigerian Manufacturing sector well-equipped with the skills needed to adopt international and modern manufacturing processes?***

The Nigerian workforce does not possess the necessary skills and qualification to handle and operate the modern and technically advanced manufacturing process. Hence, the manufacturers are not introducing the modern machinery and tools in manufacturing process and remain stagnated with the outdated technology. The manufacturing companies are not focusing on providing the necessary training and conducting workshops in improving the skills of the workforce. Due to the technological advancements, the manufacturers are required to bring

modern machinery and techniques within the manufacturing process so that the manufacturing process followed by these companies can be evaluated according to the international standards. Moreover, the current level of outdated processes cannot satisfy the customers as they want to see new and advanced features in the products every time.

Question 6: ***To what extent is the need to restructure the manufacturing process of Nigerian firms towards focusing on remanufacturing?***

The experts from the focus group interview were of the view that Nigerian manufacturers are in much need of restructuring their manufacturing process on a short term basis in order to keep up with the technological advancements in the modern era. The companies following the up-to-date manufacturing process can expect that they will retain their existing consumers and will increase the number of their consumers as well. But the companies following an out-dated manufacturing process cannot become successful because consumers want to see new features in the products every time, which is possible only by following updated manufacturing processes.

Question 7: ***To what level is the technical know-how and machinery availability affecting the performance of the Nigerian manufacturing companies?***

The manufacturers in Nigeria feel that purchasing of modern machinery is very costly affair as they have to import these machineries. The manufacturers who had invested in these machineries are spending a lot in indirect costs as they waste a lot of money in procuring the spare parts for these high cost imported machineries. This expenditure increased their cost of production drastically. Moreover, the manufacturers are reluctant in bringing these modern machineries as they feel the Nigerian workforce is not capable of handling these machines. They felt that the worker does not posses the necessary skills and capabilities in adapting to the advancements in technology. This results in using the outdated technology and because of which they are not able to be successful in satisfying the demands of the consumers and be competitive in the domestic and international markets.

Question 8: ***To what level do you think the Nigerian manufacturing firms should focus on the issues of chain, lean and agile manufacturing concepts?***

The experts felt that there is great need for the manufacturing firms to focus on issues of chain, lean and agile manufacturing to keep them updated with the emerging concepts and philosophies in the manufacturing industry. The experts insisted that manufacturers should focus on restructuring their manufacturing process and keep it updated in line with various emerging concepts and technologies so as to produce quality products that satisfy the needs of the consumers and be competitive in the market.

Question 9: ***What factors do you think play the most important role in impeding effective manufacturing process practices within the Nigerian Manufacturing sector?***

The skills and qualification levels of the Nigerian workforce is not at a level to run an advanced and modern technology based manufacturing process because they do not posses the necessary skills and knowledge to handle the new tools and techniques of manufacturing. Due to this fact, the manufacturers are reluctant to bring in modern machinery and tools into manufacturing process and continue to use the traditional and outdated methods to manufacture products. Moreover, manufacturers who had invested in these modern machineries had to spend heavily on indirect costs as they had to import the spare parts for these machineries. Further, they had to look for experts and specialists from overseas in handling these machines which is also costing them heavily. They end up with high manufacturing costs and hence price the products

very high. Hence they are not able to compete with the high priced goods in domestic and international markets.

Question 10: ***Finally distinguished participants, what are your recommendations and suggestions that the Nigerian manufacturing organizations has to emphasise, which will bring improvement in the overall state of manufacturing process concept?***

The experts from the focus group interview felt there is great need for restructuring the manufacturing process and keep it updated with the emerging concepts and technologies in the manufacturing industry. There is dire need for improving the skills and knowledge of the workforce to handle the modern and advanced tools and techniques. The manufacturers should focus on conducting necessary workshops and training for the workforce in developing their skills. They should also look at inviting the experts and specialists from other countries so that the local workforce can learn to handle the new tools and techniques from them. Further, the manufacturers can send the workforce overseas as well to gain the knowledge so that they can cope up with the technical advancements. The government should also focus on arranging the necessary finance facilities to help the manufacturers in procuring the modern machineries.

4.3 Discussions of the Research Findings

Manufacturing process is also among the three performance measures that are selected for the examination of the performance of the Nigerian manufacturing sector. In order to conduct the analysis of the sector on the basis of the manufacturing process followed by the country, there are seven questions constructed within a separate section of the questionnaire and in the light of the answers to these questions calculated in the last chapter, the performance of the Nigerian manufacturing sector is evaluated and examined. It is found that there are some very important issues that have played a role in determining the progress of the manufacturing process of the Nigerian manufacturing sector. The SAP-induced reforms that have also remained a topic of debate among many researchers and regarded by the participants of the survey as the way by which more difficulties entered the manufacturing sector.

The survey participants mostly agreed that the performance of the Nigerian manufacturing sector further declined after the introduction of SAP because the cost of production for the Nigerian manufacturers went on increasing and they have to pay more attention to the import of raw materials and spare parts for the manufacturing of the products. Due to this reason the overall cost of production increased and the growth level of the sector went on declining. Along with the SAP induced reforms, the skills and qualification level of the Nigerian manufacturing workforce is not at a level where they can run an advanced and modern technology-based manufacturing process because they do not possess the required skills and knowledge to handle new tools and techniques of manufacturing. Due to this fact there is no trend of introducing and using modern machinery and tools in the manufacturing process because the owners of the manufacturing firms are aware that without proper training their workers cannot use the advanced technology-based machinery and tools of production.

As a result the manufacturing process remains at a low standard and the firms use traditional methods to manufacture products. The participants of the survey also make it clear that there is great need for the manufacturing firms to focus upon the issues of chain, lean and agile manufacturing to keep them updated with the emerging concepts and philosophies in the manufacturing industry. Thus there is great need that the manufacturing firms' owners and operators must think over the matter that they should restructure their manufacturing process

and keep it updated with emerging concepts and technologies in the manufacturing industry. The present situation of the manufacturing process seems quite unsatisfactory in the eyes of the participants of the survey. They feel there is an essential need to restructure the present manufacturing process followed by the Nigerian manufacturing companies. In this regard they stress the need for adequate infrastructure, skilled labour and usage of advanced machinery and techniques in the manufacturing of the products.

The participants of the focus group interview also felt that the current level of manufacturing process is very low in Nigeria. According to them, the introduction of Structural Adjustment Programmes (SAP) was a disappointment as it further declined the manufacturing sector. The introduction of SAP impacted the manufacturers in Nigeria dearly as they had to pay heavily for the procurement of raw materials and spare parts and imported machinery from overseas which resulted in increasing the cost of production a lot. Hence, the manufactured goods were priced high and were not competitive in the market. The experts felt that the manufacturers should focus on adapting to new and advanced technology in their manufacturing process so that their products can be evaluated at the international level. They felt that manufacturers should focus on the emerging concepts like chain, lean and agile manufacturing to keep them updated with the emerging concepts and philosophies in the manufacturing industry.

The experts also felt that the skills and qualification level of the Nigerian workforce are not at a level to run the modern and advanced technology based manufacturing process because they do not posses the necessary skills and knowledge to handle the new tools and techniques of manufacturing. Being aware of this fact, many manufacturers are not willing to introduce modern machinery and advanced tools and techniques in their manufacturing process and production and hence continue to remain with the traditional and outdated methods. As a result, the manufacturing process remains at a low standard and they are not able to satisfy the rapidly changing needs and demands of the consumers. Hence, the consumers prefer foreign products over the locally manufactured goods. Thus, locally manufactured goods are competitive in the domestic as well as international markets. The experts felt that there is great need for the manufacturers in restructuring the manufacturing process so that they can be evaluated at the international level.

The experts suggested that the manufacturers should focus on improving the skills and knowledge of the Nigerian workforce by conducting the necessary workshops and training so that the workers are capable of coping with the advancements in technology. They recommended that the manufactures should invite the professionals and experts from overseas to create an opportunity for the local workers to gain knowledge from them. They also suggested that the manufacturing firms should send the necessary workers overseas to understand the nuances in handling the modern and advanced machineries and tools and techniques. They also suggested that government should arrange necessary finance facilities to help manufacturers procure these advanced and modern machineries. In summary, the findings of the research has fully provided an answer to the research question, which is an attempt to find out the competitiveness of Nigerian manufacturing establishments in terms of their manufacturing process.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The research is aimed at proposing the necessary suggestions and recommendations in improving the competitiveness among the Nigerian manufacturing enterprises in terms of

manufacturing process. There is great need for the manufacturers to reform the manufacturing process as the current level of process is very low. The manufacturers should understand the importance of updating their manufacturing process which will help them in satisfying the consumers' needs and be competitive in the domestic and international markets. The manufacturers should focus on investing and adapting to advancements in technology and implementing the modern tools and techniques within their manufacturing process. The manufacturers should also work towards the emerging concepts and philosophies such as chain, lean and agile manufacturing so that they can be evaluated at the international level. The manufacturers should look at conducting the necessary workshops and training for the Nigerian work force to improve their skills and knowledge so that the workers can handle the modern and advanced machines as well as the new tools and techniques of manufacturing process. They should look at inviting the professionals and experts from overseas so that the local workers can gain knowledge and hands on experience from them. They should also look at sponsoring some workers for overseas training so that they can implement the knowledge gained in improving the performance locally. The government should also work towards arranging the necessary finance assistance to manufacturers so that they can update modern machineries and advanced tools and techniques in their manufacturing process.

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Impacts of Manufacturing Strategy and Innovation in Nigerian Manufacturing Success.

U M Mustapha, S Goh and H Ku

Faculty of Engineering and Surveying,
University of Southern Queensland,
West Street, Toowoomba, 4350, Australia

Corresponding Author:
Title : Dr.
Name : Harry Siu-lung Ku
Affiliation : Faculty of Engineering and Surveying,
University of Southern Queensland.
Tel. No. : (07) 46 31-2919
Fax. No. : (07) 4631-2526
E-mail : ku@usq.edu.au
Address : Faculty of Engineering and Surveying,
University of Southern Queensland,
West Street, Toowoomba, 4350,
Australia.

Abstract

This paper focused on the manufacturing sector of Nigeria, with reference to manufacturing strategy and innovations. Using a mixed methodology approach, the research paper conducted a questionnaire survey of 254 manufacturing organizations in Nigeria. The collection of data is based on reputable companies in Nigeria that operated for more than five years before 2009 and employs more than fifty people. Based on the results, the Nigerian manufacturing sector faced hard conditions, and only an estimated ten percent showed a sustainable level of manufacturing strategy and innovations. According to the results from the survey questionnaire, the Nigerian manufacturing sector is not submission to acceptance and incorporation of new technologies and skills, which impacts negatively on the performance of such companies. The sector has been facing inadequate investment by both the government and the private sector due to high risks and uncertainties that may affect the overall performance of the sector. Among the companies that formed part of the study, only few ones have started the incorporation of new technologies, skills and strategies with an aim of boosting their performance and gaining strategic competitive advantage. The paper made a number recommendation for the improvement of manufacturing strategy and innovations in the Nigerian manufacturing sector. These recommendations include development of basic industries; improvement of infrastructure; research and development work; technology adoptability; skill development and training of the workers'; pay scales and incentives for the workforce; restructuring the manufacturing process and strategy; focusing on quality and cost reduction measures.

Key words: Manufacturing strategy, innovations, technology adaptation

1.1 Background

Manufacturing is regarded as one of the most important forces for accelerating the economic growth and development of a nation. Experts believe that the significant contribution of the manufacturing sector in the growth of the gross domestic product (GDP) can greatly support a country's economic development (Dipak and Ata, 2003). Advancements in technology and the emerging concept of globalization have introduced many opportunities as well as threats in global and local manufacturing organizations (Sethi et al, 2001). On the one hand, the manufacturing processes have become cost effective and innovative due to the use of advanced machinery and techniques. On the other hand, the highly competitive market and rapidly changing demands of the consumers and the shorter life cycle of products represent great challenges faced by manufacturing organizations of the modern days. Despite all these threats and opportunities, it is a widely accepted fact that the manufacturing sector has the power to boost the economic growth of countries that focus on its development and growth.

Many of the African countries have failed to gain a strong position through the efficient performance of their manufacturing organizations because there are several important barriers that hinder their growth and stop them from playing supportive roles in the economic growth and development of their countries. Specifically, looking at the case of Nigeria, it is found that the country is lagging behind in the significant development of its manufacturing sector (Adeoti, 2002). Nigeria is the most populous country on the African continent and is also the eighth most populous country in the world, with a population of over 140 million people at end of 2007 (NPC, 2007). Nigeria was among the middle income nations of the world during the 1970s and early 1980s due to its huge oil production and exports. However, the world oil market collapse in early 1980s resulted in major negative impacts on the economic performance and development of the country and by 1999 it fell into the list of the world's 30 poorest nations (Anyanwu, 2000). Nigerian manufacturing sector continue to play an important role through job creation, although her contribution to the overall economic growth and development of the country is not significant enough. In 2007, the formal Nigerian manufacturing sector represented 15% of the total formal employment in the country. Currently, 36% of private sector employments in the country come from manufacturing sector.

The Nigerian manufacturing sector's share was less then 5% of the GDP in 2005 and experts believe that in order to secure sustainable economic growth, there must be significant rise in its contribution (Adeolu, 2007). The manufacturing sector's contribution to the total GDP in Nigeria is very low compared with other developing countries. For example, in 2003 there was just a 4% share of manufacturing sector, whereas in China, India and Malaysia their share had reached 34%, 25% and 30%, respectively (Asian Economic Bulletin, 2004). The GDP share in these countries is regarded as significant and supportive but unfortunately the Nigerian economy lacks this type of support from the manufacturing industry. The unimpressive economic contribution of the manufacturing organizations in Nigeria is attributed to the fact that the organizations are experiencing a slow growth rate due to a set of internal and external barriers. These include a lack of basic applications of some manufacturing concepts and performance indicators as suggested by Mazumdar and Mazaheri (2003).

There have been many research studies (Kingsley and Nezianya, 1999; Tunde, 1999; Neil et al, 2002, Mazumdar and Mazaheri, 2003, Deshmukh, 2005) conducted in order to identify the main reasons behind the economic instability of Nigeria. Some of these researches revealed that the low level of performance of the manufacturing sector is an important factor that is negatively affecting the economic development and growth of the country. The researchers proposed different suggestions like manufacturing organizations concentrate on remanufacturing, learning by doing techniques and so on for improvement so that some level of economic stability can be achieved. However, it is observed that few studies have directly focused on Nigerian manufacturing sector success in terms of concepts like manufacturing strategy and innovations, therefore this research paper focus on the two identified concepts (manufacturing strategy and manufacturing innovations) that are integral to Nigerian manufacturing sector success.

1.2 Research Focus

The main focus of this paper is to analyse and evaluate the manufacturing organizations in Nigeria with respect to their success in manufacturing strategy and manufacturing innovation, over a 25 year time period (1984-2009). The outcome is used to put forward some suggestions that can bring some improvements in the manufacturing sector of the country. In this regard, the objectives of the research paper are as follows:

- To understand the importance of manufacturing strategy and manufacturing innovations that is used as variables for assessing the Nigerian manufacturing establishments.
- To trace the major developments that occurred in the Nigerian manufacturing sector with respect to manufacturing strategy and manufacturing innovation.
- To suggest some strategies and plans that could work for the improvement of the Nigerian manufacturing strategy and innovations which could also lead the country towards the path of greater economic growth and development?

In order to accomplish the objectives of the paper, the research will focus on the following central research question: **'To what extent does manufacturing strategy and innovations impacts on the success of Nigerian manufacturing sector'.**

2.1 Literature Review of Importance and Contribution of Manufacturing Strategy in Nigeria's Manufacturing Success

Manufacturing strategy is an important part of the manufacturing activities. The term manufacturing is basically meant to refer to the decision making issues and problems that the manufacturing companies' management face in their manufacturing practice so that they can achieve their manufacturing objectives by linking the performance measures to their manufacturing activities and functions (Chien and Wu, 2007). Social scientists mostly agree upon the crucial importance of manufacturing strategy and believe that firms can take manufacturing strategy as a tool of accelerating the growth of their businesses. The following review of the literature is aimed at describing the dynamics of manufacturing strategy and its critical importance for the manufacturing sector so that it becomes clear why manufacturing strategy is among the manufacturing systems variable that is chosen as a major measure of manufacturing sector performance of Nigeria.

Chen and Small (1994) observed that manufacturing strategy is an important business activity and that firms are paying more attention to this area after realizing its importance for productivity and the efficient performance of the manufacturing sector. Manufacturing strategy deals with the decisions of management related to the matter of who will manufacture the product, how the resources will be deployed in the production process and how they will arrange and organise the necessary infrastructure to support the activities of the manufacturing process. Cil (1996) explains that the manufacturing strategy evaluation is very important in order to examine the performance of a sector because the productivity and efficiency of the sector largely depends upon how the manager organises the related activities through their strategies. Grant et al (1991) pointed out that many of the companies that have successfully gained competitive advantage during the last few years have secured this competitive advantage through the effective management of manufacturing strategy. The manufacturing strategy is important for businesses as it assures the success of the manufacturing process as part of the strategic strength of a company and can provide the companies with "marketing edge through distinct, unique technology developments in its process and manufacturing operations, which competitors are unable to match" (John, 2005, p 23).
Wakelin (2001) pointed out that manufacturing strategy plays an integral part in determining the performance and success of a manufacturing sector because the determination of the long term goals as well as the objectives of manufacturing companies are based on the manufacturing strategy adopted by the manufacturing firm. The manufacturing strategy also decides what course of action will be adopted by the manufacturing firms in order to achieve the objectives and how all the required and necessary resources will be allocated so that the manufacturing companies are able to achieve all of their manufacturing objectives adequately. It is also clarified from the explanation of researchers that manufacturing strategy is a broad term that covers a wide range of decisions and policies that the management of the manufacturing sector has to take to assure work is conducted correctly for the attainment of their objectives.

Baker and Sinkula (1999) explained that manufacturing strategy basically requires the management to take major decisions regarding some of the key issues. The first and most important issue is to define their activities, type of manufacturing products and the methods of manufacturing. The management also has to decide how they should adopt the strategies through which the entire manufacturing process will contribute to the competitive advantage of their business. Both of the above mentioned key issues are resolved by the manufacturing companies under their manufacturing strategy as the core decisions regarding these issues are taken by the management under the manufacturing strategy designing and adoptability.

Beise and Stahl (1999) clarified that manufacturing strategy is nothing new for the manufacturing sector and one might trace the roots of manufacturing strategy to the Harvard Business Review article, "Manufacturing - Missing Link in Corporate Strategy" by Skinner in 1969. In this article the writer suggested that the supervisors of the manufacturing system must adopt a top-down strategy in their business operations. In this regard the writer raised an important point that the manufacturing objectives of a company must be derived from the business objectives so that the manufacturing policies

can effectively work for the attainment of these objectives.

Skinner (1985) observed the concept and objectives of the manufacturing strategy in detail. Skinner explains that manufacturing strategy can be understood as a broad array of activities that range from different structural as well as infrastructural decisions that are taken by the management of a manufacturing firm with the intention of determining the capabilities of their manufacturing system. Moreover the manufacturing strategy also decides how the manufacturing firm will operate and arrange the resources so that it can meet the set of manufacturing objectives that are set in the light of the business objectives of the company. It was also explained that the manufacturing firms must have a very clear picture in front of them of their manufacturing sector. Generally the objectives of the manufacturing firms surround the issues of cost, quality, delivery and flexibility. Along with the attainment of the objectives the manufacturing firms also remain concerned about the trade off between these objectives. In short the manufacturing strategy can be understood as the strategies and policies of a manufacturing sector that revolves around the following five key areas: "Plant and equipment, Production planning and control, Labour and staffing, Product design/engineering; and Organisation and management" (Skinner, 1985).

Thus it became very clear that in defining the manufacturing strategy it is critical that the company must focus upon the above mentioned five areas as these are identified as the main areas of concern for the manufacturing strategy developers. The identification of key five areas of manufacturing strategy provided the basic idea about the boundaries and intentions of the manufacturing strategy.

Baptista and Swann (1998) threw further light on the concept of manufacturing strategy and explained that manufacturing strategy is all about the coordination of the objectives and actions of a company applied within the functions of the manufacturing sector. The main intention of this coordination is the attainment of the medium as well as long term objectives of the firm. The main intention of the manufacturing strategy is also to bring the manufacturing company into the position where it can compete well with the domestic as well as foreign firms both at a domestic and international level. It is necessary that the manufacturing strategy must work to match the production system of the company with the requirements of the market place. In this regard the manufacturing sector must work to take up the functions and activities of the manufacturing companies that can take the manufactured products to the international level and satisfy the requirements of the consumers and global markets.

Tidd et al (2001) highlight some of the key areas that must be demonstrated by the manufacturing strategy of a firm. In this regard it is necessary that the manufacturing sector must address the key issues including the manufacturing capacity of the manufacturing sector, the production facilities available to the manufacturing system, the use of appropriate and up-to-date technology and techniques, assuring the quality of the finished products or services, the planning of the production process and the control over the material availability and the organisation of the workers as well as personnel of the manufacturing company. The above mentioned areas indicate that the manufacturing

strategy covers a wide range of activities and the future direction of the manufacturing sector is mainly decided by the manufacturing sector. So it is very important that the manufacturing companies work for the designing of their manufacturing strategy in an effective manner and with great care because the present and future performance of the manufacturing company will be hugely dependent upon these policies and plans. The effective manufacturing strategy can take the manufacturing company towards high quality and productivity and as a result the entire country will benefit.

Brynjolfsson and Hitt (2003) clarified that manufacturing strategy is regarded as the heart of the manufacturing sector as the performance and activities of the manufacturing firm depend upon manufacturing strategy. Thus it is necessary to examine the manufacturing strategy of a sector to make some predictions about the future of that sector. At the same time the present and past performance of the manufacturing sector can also be analyzed through the analysis of the manufacturing strategy adopted by that manufacturing sector. The importance of the manufacturing sector can also be understood by the fact that many of the researchers consider manufacturing strategy such an integral part of the manufacturing sector that it enjoys the same critical position as the heart in the human body and the health of the manufacturing sector also relies on effective manufacturing strategies. Thus much importance is given to manufacturing strategy by most of the researchers because the overall structure, infrastructure and manufacturing capabilities of the sector are managed through manufacturing strategy in such a manner that all of these factors can make a positive contribution to the growth and development of the sector. It is also a fact that in the absence of effective manufacturing strategy no manufacturing company or sector can perform well regardless of the presence of adequate infrastructure and other manufacturing facilities. For this reason the manufacturing strategy has been given crucial importance in most of the manufacturing companies and sectors.

Becker et al (2003) threw light on some important issues that are associated with manufacturing strategy. The researchers revealed that a decision about the geographical location of the manufacturing unit of the company is one of the most important issues in front of the management when they start designing their manufacturing strategy. It is observed that for many of the manufacturing companies involved in the production of different types of products or services, the cost of production is different at different places. In some cases if the company opts to manufacture their product at their traditional manufacturing plants then they have to spend more on labour and materials etc. but if they select any other manufacturing site where they can find cheap labour and raw materials, the company can complete the manufacturing process more cheaply. However there are some other factors that the management has to consider before deciding on the geographical site for manufacturing, such as environmental certainty, logistics difficulties, communication facilities etc. Thus site selection for manufacturing a product is a very sensitive strategic decision because the later activities of the company will be based on this decision. If the manufacturing strategy makers take the right decision then the company can accomplish its manufacturing process at a less cost while maintaining the same or higher quality but the wrong decision can have strong negative effects on the performance of the company. In this way it becomes clear how crucial a role manufacturing strategy plays within the manufacturing sector and what major

consequences could be drawn on the performance of the sector by the manufacturing strategy.

Freel (2003) observed that advancements in technology are compelling the management of the manufacturing sectors to make some revolutionary changes in their manufacturing strategies. Due to advancements in information and communication technology, there are new concepts emerging in the global market place like e-commerce, outsourcing etc. and the manufacturing firms also have to respond to the emergence of new concepts and terminologies of the business world.

The manufacturing companies must have deep insight into accessing suppliers from all over the world so they must choose suppliers who can provide good quality of raw materials at competitive rates. In the same way the companies also go for outsourcing of certain activities and can give partial control of some of their manufacturing process as to the workforce of some other country or other company. In this way the manufacturing company can benefit from the expertise and skills of the workers belonging to different countries and companies. However the companies have to ensure that there will be no compromise over the quality of their manufacturing and in this regard the right decisions about outsourcing are an important factor that can affect the future performance of the manufacturing sector. Thus the importance of the manufacturing strategy becomes clear from this perspective as well as revealing that there are different types and areas of decision making that come under the umbrella of manufacturing strategy – all possess the capability of affecting the performance of the manufacturing sector to a greater extent.

Galende et al (2003) explained that manufacturing strategy has direct effects on the performance of the manufacturing sectors because there are some key features and attributes of the products and services that came into existence as a result of the manufacturing strategies. It is a fact that the consumers of the advanced world are more demanding because they have the opportunity to make their selection about certain products or service after getting access to information about the many products available at different shopping places with different innovative features. In such a challenging situation the manufacturing companies have to portray their product in front of the consumers in such an attractive manner that they are influenced to buy it. For influencing consumer behaviour it is necessary that the product or service must offer some unique features and functions that can catch the attention of the consumers. The availability of such features in the product or service is the key decision that is taken by the management while designing their manufacturing strategy because the manufacturing strategy covers decisions about product design and features so the success or failure of the product on the basis of its features and functions also results from the manufacturing strategy.

Kermally (2002) observed that the right manufacturing strategy can help the manufacturing company in aligning with technological advancements. The manufacturing strategy also decides what technology, devices and techniques will be adopted by the company in the process of manufacturing. If the manufacturing strategy suggests appropriate and updated techniques and devices then the output of the

manufacturing company will also be aligned with technological advancements. On the other hand, if the manufacturing strategy directs the manufacturing company to remain stuck in their traditional methods and tools then there is a great possibility that the end product will not be of the global standard and at the same time the product will not be regarded as technically sound. In this way the manufacturing sector can decide the future of the product in terms of technical and technological alignment.

Kremp et al (2004) observed that global competition and rapid technological advancements are compelling the manufacturing sectors to design such manufacturing strategies that can help them in meeting the challenges of the technology-driven and highly competitive market place. The researchers foresee that many of the manufacturing sectors will be compelled to adopt such manufacturing strategies in the coming days that can assure the low cost of production along with high performance and quality of the product or service and for the attainment of these objectives they do not have to manufacture the products through the utilization of their old and traditional methods and machinery but will be required to make rapid changes in their manufacturing process by introducing different advanced technologies in their manufacturing units like programmable automation, flexible robotics etc. The introduction of such technologies through manufacturing strategies will result in the increment of manufacturing flexibility in the sector and at the same time the manufacturing company will be able to quickly respond to the rising demands of the competitive markets while they have to spend less due to cost effectiveness of the advanced manufacturing methods and machinery.

Freel (2003) further explained that the manufacturing companies operating in different types of products are giving much importance to manufacturing strategy because its critical importance for the success of the entire manufacturing process is realized by most of the experts and specialists operating in the manufacturing field. It is considered that manufacturing strategy is all about making decisions and plans related to three major issues. The first issue is about the method or process of manufacturing that is how the product will be manufactured by the company. The second issue is related to the allocation of resources – in order to complete the manufacturing process how the company will deploy resources to the production unit. The third issue is related to the infrastructure to support the manufacturing process – how the company will assure the provision of required infrastructure in an adequate manner so that the manufacturing process can be carried out in a smooth way. These are the three basic issues in front of management when designing the manufacturing strategy. However it is a fact that the manufacturing sector has become a much wider term and the companies have to focus on several other important issues like outsourcing, workforce arrangements, technology adaptation and techniques and device selection etc.

Hence it is revealed from the above review of the research studies that manufacturing strategy is an integral part of the manufacturing sector and along with the passage of time the importance of manufacturing strategy is also rising. It is also proved that manufacturing strategy can assure the success of a manufacturing sector because the key decisions made under the manufacturing strategy can work for the success of the product in terms of popularity among consumers as well as competitiveness at an international

level. The manufacturing strategy revolves around the major decisions that the management of the manufacturing company has to take related to the manufacturing process, the allocation of resources and the availability of infrastructure. Along with these key issues the manufacturing strategy has to cover some other important issues such as the decisions that the company has to make whether to outsource some activities and what geographical location will be best for the company so that the manufacturing can be accomplished by employing cheap labour and materials while maintaining the same quality and standard of manufacturing. The importance of manufacturing strategy is explained very well in the above discussion and it becomes clear that manufacturing strategy possesses the capability to strongly affect the performance and success of a manufacturing sector. For this reason manufacturing strategy is also among the measures that will be analyzed to examine the performance of the Nigerian manufacturing sector.

2.2 Literature Review of Manufacturing Innovation in Nigeria Manufacturing Success

Innovation is an emerging critical issue for the manufacturing sector that could be defined as the radical as well as "incremental changes in thinking, in things, in processes or in services" (Chesbrough, 2003). Sethi et al (2001) holds the opinion that innovation is a creative strategy and for efficient performance of the manufacturing sector in the highly competitive market place it is necessary that the companies focus on the innovation of design so that their products can bring them high revenues and the overall performance of the sector could be improved as well. There are several research studies conducted by different researchers to understand the importance of innovation in the manufacturing sector and to study the impact of adopting innovation on the performance and profitability of a company. It is disclosed from the results of most of the studies that innovation has become a must for the manufacturing sector and now the companies have to focus on innovating products rather than just designing them in order to catch the attention of the consumers and to increase their sales revenues.

Rothwell (1992) concluded that innovation has an important role to play in the manufacturing sector and to evaluate the performance of any country's manufacturing sector performance it is necessary that one must look critically at and review the innovation of products and design adopted by the companies of that sector. Nowadays the term innovation refers to the practical relationship between design and innovation. Mans and Francis (2000) conducted an empirical study to analyze the technology adoptability, importance of technical and locatable efficiency in the African manufacturing sector and selected Ghana for conducting the research. It is discovered from the research study that the foreign operated firms in the country are efficient with respect to the usage of technology and the local owners put less emphasis on technological developments due to this fact the manufacturing sector of Africa is not uniformly progressing and some of the firms are performing better from the perspective of technology, innovation and strategy whereas many of them are lagging behind. The researchers concluded that there is a need for awareness among the management of the local manufacturing companies so that they can go for adoptability of technology and innovative techniques within their firms and the performance of the manufacturing sector of Africa can be improved.

De Propris (2000) concluded that in the twenty-first century there is a great challenge

ahead of the manufacturing firms: they have to prove themselves as more innovative, creative as well as responsive to the global market so that they can justify their existence in the highly competitive market and can also work for the economic stability of their country. The researcher pointed out that innovation has become so critical for manufacturing firms that in some of the countries it has become such a great threat to the manufacturing sector that the companies have to face tough competition in order to innovate new features for their products and services to generate value for the consumers. Innovation has appeared as an integral activity for the manufacturing companies and it is also proved that by adopting innovative strategies and product designs, a firm can play a vital role in attaining sustainable growth for a country.

Ahuja (2000) pointed out that the importance of innovation adopted by the manufacturing sector can be understood by the fact that generally the consumers have great interest in the activities and strategies of the manufacturing companies, especially those associated with consumer products and these people also want to see new strategies and policies of the manufacturing companies after short intervals so that they can see that manufacturing firms are responding well to the environmental changes and updating their production process according to technological advancements. The consumers ideally have such great trust in the performance of the manufacturing companies that they consider them as the future creator of the economic growth of the country and the manufacturing firms can maintain this expression only if they can maintain the attention and loyalty of their consumers towards their products by providing the consumers with an updated and unique product or service. In this context the demand for innovation is at its peak at a global level and the manufacturing sector all over the world is looking for the latest technology usage, capital, creative skills and related services that can assist these companies in innovating unique ideas for their products and services that can finally work for the stability of the company, the manufacturing sector and the entire economy of a country.

Ahuja (2000) revealed that where globalization has made a significant impact in each and every facet of human life and business, the manufacturing world is also witnessing these changes and as a result it has become necessary for the companies operating in the manufacturing sector to prove through their output that they are capable and deserving enough to stand among the other firms in the global competitive era as they can offer the consumers products and services with innovative features and functions. Due to this fact the manufacturing sectors are going through a phase of transformation where each and every strategy and process of manufacturing is directed by the motive of innovating new and unique ideas, concepts and designs for products and services. In this regard the role of research and development has an important role to play and the manufacturing companies are largely hiring the services of the scientists and engineers who can conduct the background studies to assist the company in generating innovative ideas for the products and services. For this purpose the manufacturing companies are also compelled to invest a considerable amount in research and development related activities.

Belderbos (2001) pointed out that the increasing importance of innovation in the manufacturing sector is backed by some important issues and elements including

“modeling and simulation, nanotechnology-based materials, adaptive supply networks, customer knowledge sharing, on-demand customization, shared use facilities for R&D and prototyping, complex numerically controlled tooling and advanced CAD/CAM” and so on. It is very important to keep in view that the manufacturing firms have to concentrate a great deal on the above mentioned technologies and concepts so that they can draw benefits from the emergence of the relevant technologies and can take control over the wages and cost of the product. In this way the manufacturing firms can easily compete with foreign firms by minimizing their production costs and wages expenses. At the same time the appropriate usage of the technology and advanced tools will have a significant impact on the product or services that can result in an increase of sales revenue and stability in the manufacturing sector.

Darroch and McNaughton (2002) pointed out that innovation is not a tangible thing that a company can bring in to its business by utilizing certain technology or machinery. The manufacturing sector must understand that in order to be innovative, they have to make revolutionary changes, and according to requirements some structural changes, in their patterns of working. The manufacturing firms are essentially required to keep themselves updated with the advancements occurring in their surrounding so that they can be aware of all the new techniques and advancements that they can avail themselves of in order to make their manufacturing activities more advanced, up-to-date and efficient. In this regard it is important that the manufacturing companies realize the importance of the collaboration between different components of the economy. It is necessary that there should be collaboration between the industry, customers, suppliers, researchers and the government so that all of these players can work with each other and can also share the risk, time and cost that is required for the development of any new technology. This collaboration can also ensure the integration of the new design and techniques in a modular fashion that will enable the manufacturing firms to adopt new technology in a convenient manner. Along with the collaboration it is also necessary that there must be adequate investment in the manufacturing sector. In this regard the companies operating in the sector, the government and the finance providers must make the arrangements for the investment in the workforce as well as in the organisational and financial models. The adaptation of new technologies along with collaboration and investment in human and organisational matters can enable a firm to provide such products to the consumers that can assist the company to compete at an international level.

Baldwin and Johnson (1996) highlighted some important issues that can work for bringing innovation into the manufacturing sector of a company. The researchers highlight that the manufacturing sector must look for opportunities through which the production capabilities of the sector can get access to overseas locations. When the designers and the experts of one manufacturing sector work along with the experts of another country, that country ideally should be higher in manufacturing quality, then there is great scope for innovative ideas as well as technology adopted by the overseas country’s manufacturing sector to be shifted into the home country’s manufacturing sector and the companies operating at a domestic level will acquire many new ideas related to the innovation of products and services. In the same way the workforce of the manufacturing sector will get the opportunity to get training in the manufacturing process

in other countries and as a result there will be improvement in the skilled level of the manufacturing workforce.

In this way overseas access to the technologies and training opportunities can benefit a country in so many ways. If a country has decided to conduct all necessary arrangements that can bring innovation in its manufacturing sector then it is necessary that they must focus on getting access to the manufacturing sectors of other countries because in this manner they can shift technology, skills and techniques in their own country that can help them in innovating new products and services. This will also help the manufacturing sector to manufacture the products at an international level because a closer look at the international products will enable them to add new features in their own products.

Ahuja and Katila (2001) pointed out that innovation requires the manufacturing companies to give up their traditional methods of manufacturing. The manufacturing sector must accept the reality that they have to discontinue using their old manufacturing and business models because the modern era requires new ones. The business models of the modern world must work for the integration of services, manufacturing design, and manufacturing stages so that the entire process of the product can be managed in an effective manner and the sector can produce valued products and services for the consumers all over the world. Innovation in the manufacturing sector will also be reflected as well as supported by the fact that the manufacturing companies operating in the sector are proficient in the usage of different software and communication technologies.

At the same time the manufacturing companies should also conduct their routine business and manufacturing activities through the usage of computer devices and sensors so that the entire manufacturing system can work in an efficient and advanced manner. The developing countries are focusing a lot on the usage of computing technology and devices in the manufacturing process and the countries lagging behind in the development process must realize that they can walk along with the developing and developed nations only when they adopt advanced computing techniques and devices and implement them within their manufacturing system. Neglecting computing skills and devices within the manufacturing sector is a great barrier to the growth of any manufacturing sector in the technology driven market place of today. Thus it is necessary that the manufacturing companies must follow the computer usage patterns of the developing countries so that they can also adopt those patterns in the manufacturing sector and be in a position to produce the products and services of the same standard and quality as those of the developing countries.

Cefis and Orsenigo (2001) observed that some countries are facing problems in coping with the technological advancements and their manufacturing sectors are also not performing well enough to be evaluated at an international level. The researchers pointed out that one of the main reasons behind the failure of the manufacturing sectors is that they are lagging behind in the usage of advanced software. It is a fact that in the modern era if any manufacturing company or sector ignores the importance of computer software and devices or due to some reason there is lack of software interoperability, then there are

more chances that the manufacturing sector of the country will not be able to compete with others at a global level. At the same time the products designed by the company will not be updated and efficient enough to meet the demands and expectations of the domestic consumers.

Thus it is a fact that lack of computing technology adoptability is a great barrier that hinders innovation in product manufacturing and as a result the manufacturing sector remains inefficient and less productive. Anselin and Varga (1997) explained that the on-going advancements in technology are compelling the manufacturing sector to be more advanced and innovative so that the changing demands of the consumers could be successfully met. The researchers observed that the small and medium enterprises are in more need of adopting technology to bring innovation in their activities. The reason behind this need is that in most of the countries there are considerable portions of the workforce employed by the SMEs and these SMEs also have a major share in the overall productivity of a country. Thus, being a major portion of the production unit of a country, it is necessary for the SMEs to adopt advancements in technology so that they can bring necessary changes in their functions and activities and meet the coming challenges of the new millennium.

Diez (2000) revealed that if a manufacturing sector intends to become strong and competitive then it is necessary that it must have the support of some factors. Among these factors technology adoptability is important. It is important that the labour of the manufacturing sector must be skilled enough to deal with advanced technology. Most experts believe that the performance of the manufacturing sector is the backbone of the economic development of a country thus the countries have to focus on improving the performance of their manufacturing sector. Improvement in the performance of the manufacturing sector can be made by introducing innovative ideas throughout the manufacturing process and for this the usage of advanced technology is an essential requirement. Adequate research and development also supports innovation in the manufacturing sector so the countries must make some arrangements for R&D work related to the manufacturing sector so that the result of the research work can assist the manufacturing firms in innovating new concepts and ideas for their product design and manufacturing process. It is a fact that must be realized by the manufacturing sector related professionals that there is a great need for fresh ideas in the manufacturing industry so they should always be ready to bring new ideas through innovation that can contribute to the introduction of innovative manufacturing processes in the industry.

Beneito (2003) pointed out that the manufacturing sector plays an integral role in the economic development of countries and it is necessary to keep a keen eye on the issues and factors that can influence the performance of the manufacturing sector. The researchers pointed out that in many of the countries it is observed that the innovation of new product designs, manufacturing process and strategy plays an influential role and affects the performance of the manufacturing sector to a great extent. This fact explains very well that for the survival of any manufacturing sector it is essential that there must be a thrust for innovation as it is one of the critical factors that can assist competitiveness in the industry. While keeping in view the importance of innovation, it is necessary that

steps should be taken at a national level and there must be formulation of such policies that can promote innovation in the manufacturing sector. The government must take some steps for the promotion of training and skill development of the workforce so that they can become technologically up-to-date and can bring innovative ideas into the manufacturing sector.

The above review of the literature explains in detail the importance of innovation for the manufacturing sector. Some other researchers (e.g. Beugelsdijk and Cornet, 2002; Archibugi et al, 1995; Bagchi-Sen, 2001; Bharadwa and Menon, 2000) have also worked to explore the importance of innovation in the manufacturing sector and it is disclosed from most of the research studies that there are strong relationships between innovation, profitability, high performance and efficiency. Academic writers explained in detail the role of innovation for the successful survival of a manufacturing sector and in the light of the above review of the research it becomes clear that innovation is one of the most influential factors that can make a significant change in the performance of a manufacturing sector. The above discussion also throws light on the need of putting innovation among the measures of the performance of a manufacturing sector and it becomes obvious that negligence of innovation is a critical mistake that can lead to a low level of performance.

Thus to evaluate the performance of the Nigerian manufacturing sector, innovation is also an important measure as it is found that the sectors succeeding in innovation are successfully surviving and competing at the international level but the sectors ignoring these emerging and important factors are lagging behind the others in performing well at domestic and international levels and to meet the increasing demands and expectation of the consumers. It is also revealed that the manufacturing sectors must be open towards the usage of computing technology and devices so that they can assist their manufacturing process through different software and can take advantage of technology in terms of low cost of labour and production. At the same time research and development work is a key factor that can bring innovation in the manufacturing sector so the countries have to focus on research and development work along with the adoptability of advanced information and telecommunication tools and devices within their manufacturing systems (manufacturing strategy, manufacturing process and innovation).

3.1 Research Methodology

There are three important issues in formulating research design and methodology (Creswell, 2003). Firstly, the researcher has to decide what would be the purpose of the research, secondly, what would be the process of conducting the research and thirdly, what would be the outcome of the research. When deciding the purpose of a research, types of researches must be understood very clearly so that it can be explained which research type will be most suitable for the research purpose. There are basically four types of research purposes including “exploratory, descriptive, explanatory and predictive” (Johnson and Onwuegbuzie 2004, p27). This research is both exploratory and explanatory. It is exploratory because the researcher generally looks for ideas and patterns to gain insight and deep familiarity with the subject matter. Based on the literature review, it is found that this research work is exploratory in nature as it explores

various two manufacturing concepts (manufacturing strategy and manufacturing innovation) that have not been fully unfolded in the previous studies.

This research is also an explanatory type of research. Mostly, explanatory research is based on empirical studies and tested hypotheses that are formulated by researchers in order to find out the solution to their problem statement (Saunders et al, 2002). Explanatory research enables the researcher to generally go for description of the characteristics and analysis and explanation of the entire situation to find the reasons behind any incident. This type of research strives to understand and explain the phenomena through the discovery and measurement of the casual relationship between different factors. From these arguments, this research is also an explanatory as it is aimed at explaining two different manufacturing concepts in details.

The research study employs a mixed methodological research approach. This has been chosen because it is a significant method for conducting different types of research studies. Johnson and Onwuegbuzie (2004, p27) explained that "mixed-method kind of research draws upon the strengths of both quantitative and qualitative analysis, which enables the researcher to draw upon several methodologies in measuring the variables of the study". In this way the research used a combination of methods that are both qualitative and quantitative in nature. The research applied a questionnaire survey research methodology comprising of 264 manufacturing establishments. The questionnaire survey in the form of a quantitative research which is an empirical study that investigates the role of manufacturing strategy and manufacturing innovations in the Nigerian manufacturing establishments. In the light of the literature review, the study specifically addressed relevant issues such as management skills and technical capabilities, potential to generate unique and competitive ideas and concepts for products and adequate research to determine the demands and expectations of the consumers, among other issues.

The questionnaire for the survey was constructed by using the Likert scale as well as traditional open-ended questions (Appendix A shows the details of the questionnaire). The questionnaire is broadly divided into 3 sections as shown below.

- Section I (Optional Section)– Information about respondent's company
- Section II – Information about manufacturing Strategy in Nigerian Manufacturing organizations
- Section III – Information about innovation in Nigerian manufacturing organizations

The primary research conducted for the study is the statistical survey for which the sample of 264 companies involved in the manufacturing of different consumer goods in Nigeria was selected and the questionnaire was sent to these companies using different methods, such as email and face-to-face administration. After the deadline of three months 264 responses were collected; out of these ten were rejected and 254 were finally accepted for the results calculation. As the questionnaire was divided into different sections to individually focus on each and every aspect of the issues, the results of the survey are also calculated separately for each question and section.

These results are presented according to the sections of the questionnaires. Two sections of the questionnaire (excluding sections I) are constructed using the Likert scale and the respondents were requested to select the numerical value for each and every given statement to show their degree of agreement with that statement. The respondents were asked to express their views about the matter in given statements as 1= Very High, 2= High, 3= Medium, 4= Low, 5= Very low. The responses received for each of the values are calculated and presented in the results according to the meaning of that numerical value to show the level of agreement of the respondents. For example if there are 34 responses received for the value 1 then it is stated in the results that 34 percent of the respondents graded the expression in the given statement as Very High and so on.

4.1 Research Findings

The findings of the research are presented in two parts (4.1 and 4.2 as shown below)

4.1.1 Information about Innovation in the Nigerian Manufacturing Sector

This section of the questionnaire consists of seven questions and these questions are related to innovation in the manufacturing of consumer goods in the Nigerian manufacturing sector. Following are the results obtained from section II of the questionnaire.

In the second section of the questionnaire, the first question asked of the respondents was how they see the present level of technology usage in the product design of Nigerian sector. In reply to this question 12 (5%) of the respondents said Very High, 36 (14%) said High, 122 (48%) said Medium, 84 (33%) said Low and 0 (0%) said Very Low. It is found from the results that the respondents of the survey believe that the technology usage level in the Nigerian manufacturing sector has reached a level that can be regarded as medium for the product design of consumer goods.

The second question asked of the respondents was up to what extent the manufacturing companies of Nigeria offer different consumer products with innovative features. 20 (8%) of the respondents replied Very High; 34 (14%) said High, 132 (52%) said Medium, 58 (23%) said Low and 8 (3%) said Very Low. The answers also make it clear that most of the respondents of the survey see innovation in product design of Nigerian manufactured consumer goods at a medium level.

In the third question of the second section, the respondents were asked if there are differences in the present Nigerian consumer products' manufacturing design and features as compared with the past. In reply to this question 24 (9%) of the respondents said Very High, 144 (57%) said High, 78(31%) said Medium, 6 (2%) said Low and 2 (1%) said Very Low. It is found from the results of this question that the difference between the present design of the products in the Nigerian manufacturing sector is very high as compared with the past.

The fourth question asked of the respondents was if in their view the present level of advanced technology usage in the product design of the Nigerian manufacturing sector is satisfactory. 0 (0%) of the respondents said Very High, 4 (1%) said High, 48 (19%) said

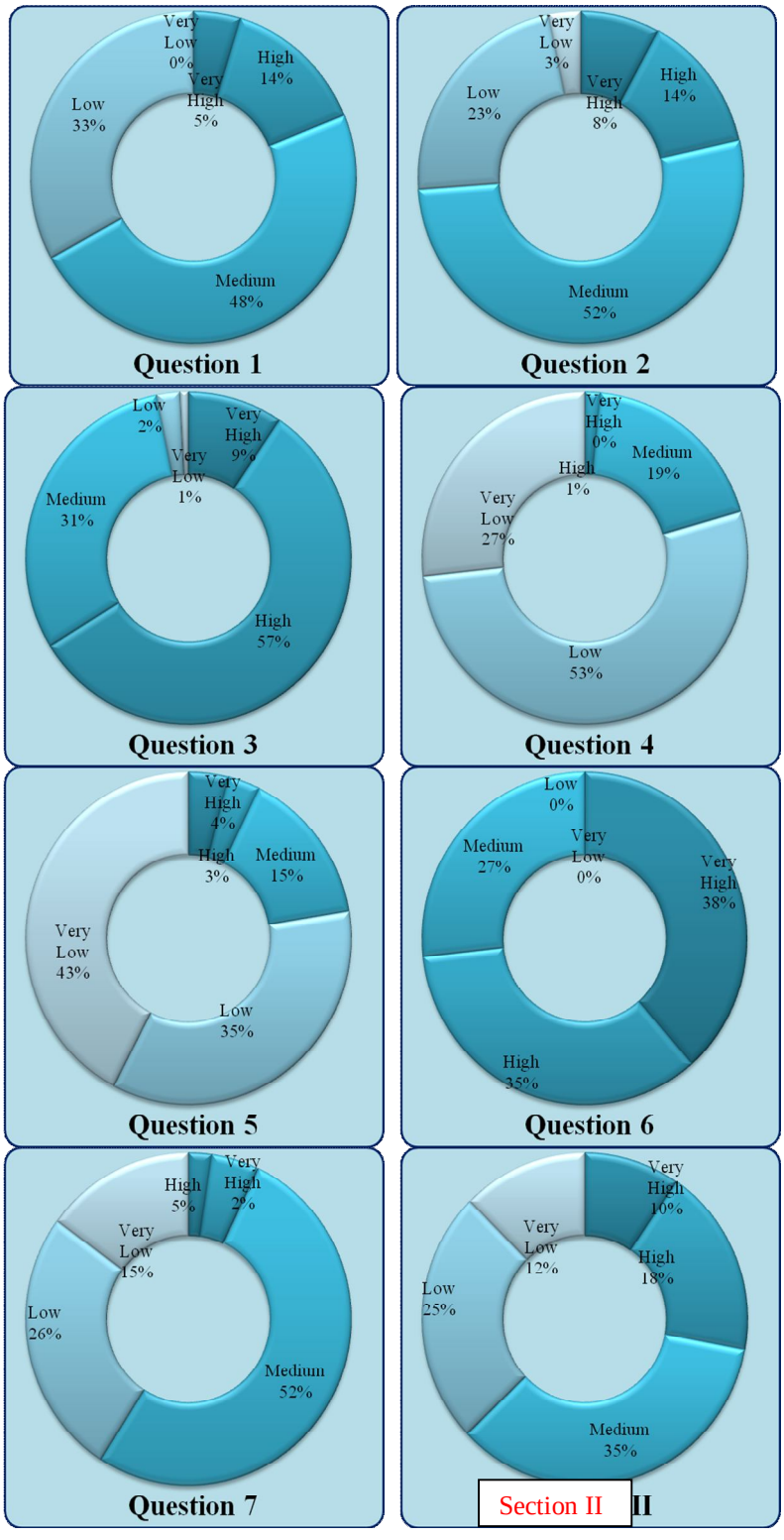
Medium, 134 (53%) said Low and 68 (27%) said Very Low. It is found that most of the respondents of the survey believe that present technology usage in product designing is at a low level.

The fifth question asked of the respondents was about the standard of the Nigerian manufacturing sector in offering innovative consumer products in the context of globalization and high competition. 10 (4%) of the respondents said Very High, 8 (3%) said High, 38 (15%) said Medium88 (35%) said Low and 106 (43%) said Very Low. Thus it is found that there is a low standard amongst Nigerian manufacturing companies in offering innovative consumer products in a highly competitive environment.

The sixth question asked of the respondents was about the level of awareness among Nigerian manufacturing companies regarding adopting innovative designing and techniques for product manufacturing. 98 (38%) of the respondents replied Very High, 88 (35%) said High, 68 (27%) said Medium, 0 (0%) said Low and 0 (0%) said Very Low. It is found that the level of awareness is very high among the manufacturing companies of Nigeria regarding the adoptability of innovative designing and techniques for product manufacturing.

The seventh and last question of the second section of the questionnaire asked of the respondents was how much the manufacturing firms of Nigeria give strategic and critical importance to innovation in product design. 6 (2%) of the respondents said Very High, 12 (5%) said High, 132 (52%) said Medium, 66 (26%) said Low and 38 (15%) said Very Low. It is found that many of the survey respondents see that the manufacturing companies of Nigeria give a very high level importance to innovation in product designing.

All seven questions of this section were calculated separately as well as combined to get the overall opinion of the respondents about innovation in the Nigerian manufacturing sector and according to the combined calculation 170 (10%) of the respondents rated innovation within the Nigerian manufacturing sector very high. According to the opinion of 326 (18%) respondents the level of innovation is high, 618 (35%) regarded it medium, 436 (25%) low and 222 (12%) very low. Thus it is revealed from the collective results of this section that the respondents of the survey rated innovation within the Nigerian manufacturing sector at a medium level.
The results of all the seven questions of the third section as well as the overall results of the third section can be seen in chart form as below:



4.1.2 Information about Manufacturing Strategy in the Nigerian Manufacturing Sector

The third section of the questionnaire consists of seven questions related to the

manufacturing strategy adopted by the companies operating in the Nigerian manufacturing sector. Following are the results obtained from section IV of the questionnaire.

In the third section of the questionnaire, the first question asked of the respondents was whether the Nigerian manufacturing companies were following an up-to-date strategy for the manufacturing of different consumer products. 6 (2%) of the respondents said Very High, 20 (8%) said High, 58 (23%) said Medium, 116 (56%) said Low and 28 (11%) said Very Low. It is revealed from the results of this question that most of the professionals operating in the Nigerian manufacturing sector believe that the manufacturing strategy of the Nigerian manufacturing companies is at a medium level

The second question asked of the respondents was if the manufacturing process adopted by the Nigerian manufacturing companies is acceptable by international standards. 0 (0%) of the respondents replied Very High, 2 (1%) said High, 4 (1%) said Medium, 126 (50%) said Low and 122 (48%) said Very Low. Thus it is found that the respondents of the survey strongly believe that the manufacturing process adopted by the manufacturing companies of Nigeria is very low by international standards.

In the third question of the third section, the respondents were asked whether they feel that Nigerian manufacturing firms are successfully capturing the attention and loyalty of the consumer through the adoption of effective manufacturing strategy. 2 (1%) of the respondents said Very High, 2 (1%) said High, 18 (7%) said Medium, 116 (45%) said Low and 116 (46%) said Very Low. The results of this question make it clear that the professionals who participated in the survey believe that the manufacturing companies of Nigeria are progressing at a very low level in the context of capturing the attention of the consumers and retaining their loyalty.

The fourth question asked was how much the weak infrastructure of the operating environment of the country hinders the development and implementation of effective manufacturing strategy in the country. 158 (63%) of the respondents said Very High, 68 (27%) said High, 26 (10%) said Medium, 0 (0%) said Low and 0 (0%) said Very Low. Thus it is clarified from the results of this section that the manufacturing sector is highly affected by the weak infrastructure of the country according to the opinions of the respondents of the survey.

The fifth question asked of the respondents was whether there are some major flaws in the manufacturing strategy of Nigerian manufacturing companies. 132 (52%) of the respondents said Very High, 98 (39%) said High, 12 (5%) said Medium, 8 (3%) said Low and 4 (1%) said Very Low. It is found that there is a very high level of flaws observed in the manufacturing strategy of the Nigerian manufacturing firms by the professionals who participated in the survey.

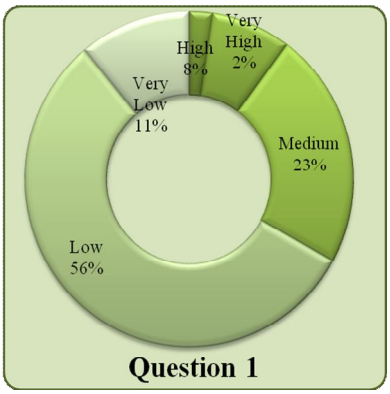
The sixth question asked of the respondents was whether there is a need for Nigerian firms to follow the patterns of other developing countries' firms to develop effective and productive manufacturing strategy. 86 (34%) of the respondents replied Very High, 116

(56%) said High, 20 (8%) said Medium, 6 (2%) said Low and 0 (0%) said Very Low. The answers of this question show that the respondents of the survey strongly feel the need for Nigerian firms to follow the patterns of the other developing countries' manufacturing processes.

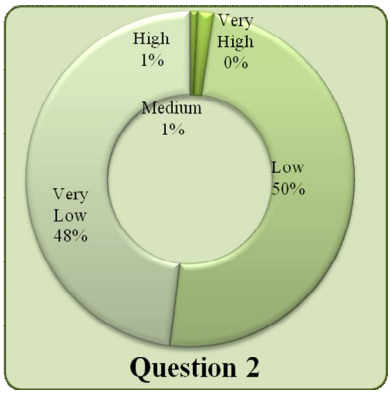
The seventh and last question of the third section of the questionnaire asked respondents how much need is there for major reforms in the manufacturing strategies adopted by Nigerian manufacturing companies. 82 (32%) of the respondents said Very High, 96 (39%) said High, 70 (27%) said Medium, 4 (2%) said Low and 2 (1%) said Very Low. It is discovered that the professionals working in the Nigerian manufacturing sector strongly feel the need for major reforms in the manufacturing sector strategies adopted by the companies.

All seven questions of this section were calculated separately as well as combined to get an overall opinion of the respondents about the manufacturing strategy adopted in the Nigerian manufacturing sector and according to the combined calculation 233 (26%) of the respondents rated the manufacturing strategy adopted by the companies operating in the Nigerian manufacturing sector Very High. According to the opinion of 428(24%) respondents the manufacturing strategy level is high, 208 (12%) regarded it as medium, 202 (23%) low and 272 (15%) very low. It is shown from the collective results of the survey that the participants for the most part feel the need for reforms in the manufacturing strategy of Nigerian companies and at the same time they also think that Nigerian firms should learn from other developing countries so that they can also proceed along the development path. It is also discovered from the survey results that most of the respondents see the present manufacturing strategy of Nigerian firms as being at a very low level and realize that it cannot help the country at an international level because through this strategy the manufacturing firms are not able to capture the attention of the consumers or successfully retain the loyalty of their existing consumers

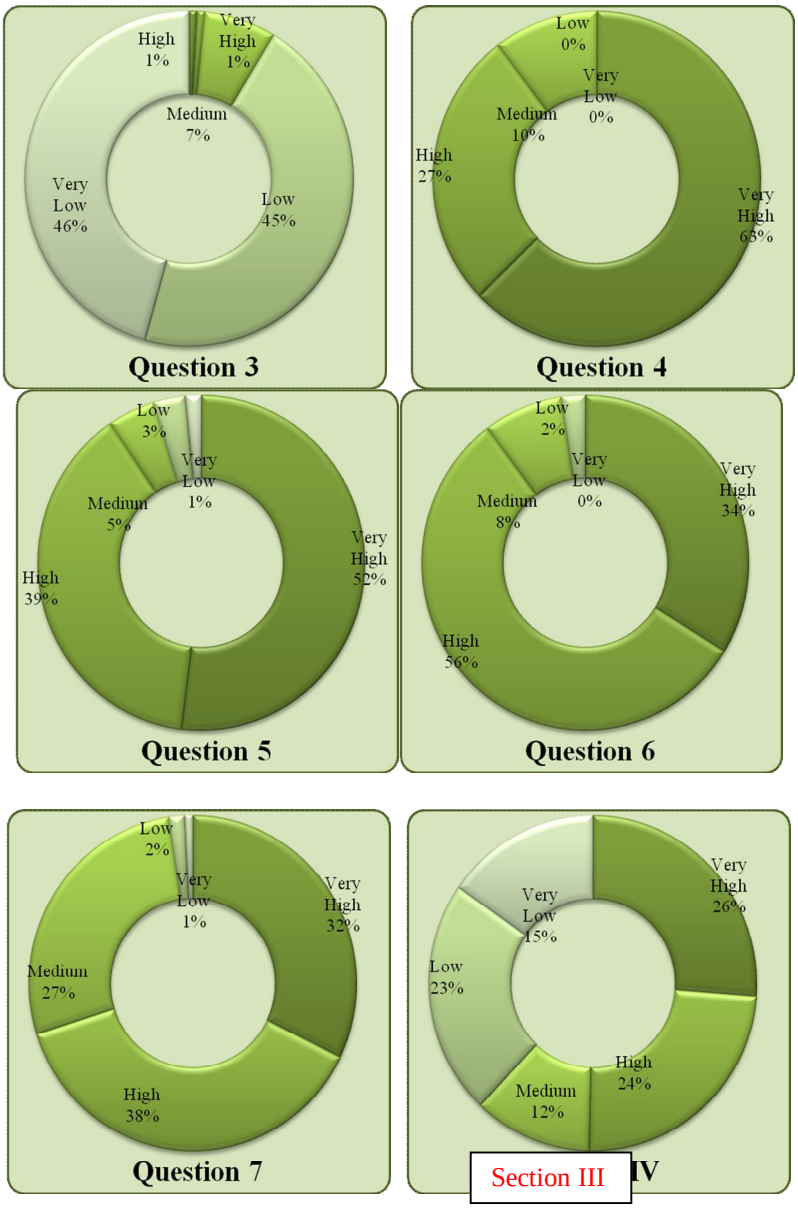
The results of the seven questions of the fourth section and the overall results of this section can be seen in chart form as below:



Question 1



Question 2



4.3 Discussions of Research Findings

4.3.1 Innovation in the Nigerian Manufacturing Sector

In order to examine innovation in the Nigerian manufacturing sector, there is a section included in the survey questionnaire and there were seven questions asked from the respondents to know about their views regarding innovation in the Nigerian manufacturing sector. It is found from the survey results calculated in the last chapter that the present level of technology usage is not very high in the Nigerian manufacturing sector and many of the participants of the survey see it at medium and low level. Due to this relatively low level of technology usage the manufacturing companies of Nigeria also failed to offer the consumers many innovative products in the view of the survey participants. They also mentioned that a high level of improvement came in the design and features of the Nigerian products compared with the past but despite this improvement, the present level of technology usage and innovation is not satisfactory.

The survey participants also concerned about the fact that in the present wave of globalization and high competition, the product designs and features of the Nigerian manufacturing sector are not of a standard that can assist the country in its survival. At the same time the survey participants see that manufacturers in Nigeria are becoming more and more aware about bringing innovation into the manufacturing sector but still they do not give much strategic importance to innovation in product design. Thus innovation within product design and the manufacturing process of the Nigerian manufacturing sector is not found at very satisfactory level in the eyes of the professionals working in the sector because they see the present level of innovation and technology usage at very low position. Although the respondents of the survey have also observed that compared with past the manufacturing companies in Nigeria are doing well from the point of view of innovating new ideas, comparing this innovation level with international standards, it is found that Nigerian firms are performing at a very low level. In this regard the attitude of the manufacturing sector companies is positive in that they are aware of the fact that in order to compete at an international as well as at domestic levels they need to be more innovative and strategic towards the adaptation of innovation. However despite this awareness in practice they are focusing less on innovating new ideas for product design and the manufacturing process due to which the present level of innovation still cannot be evaluated at some satisfactory level according to the opinion of the participants of the survey.

4.2.2 Manufacturing Strategy in the Nigerian Manufacturing Sector

In order to evaluate the performance of the Nigerian manufacturing sector on the basis of the manufacturing strategy adopted by Nigerian companies, a section was dedicated to it in the survey questionnaire. Seven questions were asked of the respondents about the manufacturing strategy adopted by the Nigerian manufacturing sector. The results of this section calculated in the last chapter show that the participants of the survey are not much satisfied with the current manufacturing strategy adopted by Nigerian manufacturing companies because most of the respondents think that the present strategy of Nigerian manufacturing is not aligned with the requirements of the present situation. Due to the fact that manufacturing strategy is not up-to-date, the Nigerian manufacturing sector cannot compete with other countries at an international level. Moreover the manufacturing strategy of Nigerian companies looks at such a low level that there is little chance that with this manufacturing strategy the manufacturing companies of Nigeria will be able to retain their existing consumers or they will not be able to attract new consumers.

The participants also identify that the operating environment of the country is not suitable for the activities of the manufacturing industry. For this reason the strategy adopted by the companies does not appear to be successful in the current situation. Despite the presence of problems in the operating environment the participants of the survey also blamed the companies operating in the manufacturing sector for the ineffectiveness of the manufacturing strategy because there are lots of flaws in the current strategy. As a result there is an essential need for the manufacturing companies to make some major reforms in the current manufacturing strategy and for this purpose they can also look towards the developing countries and pick from their strategies and planning to implement suitable

strategies in their own manufacturing sector.

Thus there is an overall dissatisfaction observed among the participants of the survey and the results of this section clearly indicated that there are major reforms required in manufacturing sector strategy as the present strategy is not acceptable at a domestic or international level. The operating environment of the country is also a factor behind the inefficient manufacturing strategy and the manufacturing companies have to remove the flaws from their system by following the patterns of the developing countries like China, India and Malaysia. This will help them in identifying the factors that are creating problems for them and then they can also find the solution from the policies of the developing countries. In turn the manufacturing strategy of the Nigerian sector can also reach a level where it can compete with other countries and can also catch the attention of more consumers from inside the country as well as from the international market. In this regard the planning of the owners and operators of the manufacturing firms of Nigeria is very important because proper planning can determine the success of the manufacturing strategy and can take the country towards the path of development.

The findings of the questionnaire survey show that there is little contradiction between the existing work of the researchers and the practical evidence collected from the business world because most of the problems and issues identified in different social scientific research are further confirmed by the opinions of the participants of the survey. For example it is found that most of the researchers are disappointed with the performance of the Nigerian manufacturing sector and see the sector as very unsupportive of the economic development of the country. In the same way the participants of the survey also expressed the view that the present performance level of the manufacturing industry is very low in their opinion. Likewise the measures of manufacturing sector performance are also regarded as very weak in the primary research.

In the secondary research also there is an overall impression reflected that manufacturing innovation and manufacturing strategy adopted by the Nigerian manufacturing firm is not up-to-date with the demands of the modern era. The researchers and the participants of the survey are agreed upon the fact that the problem of inadequate supply of energy resources, raw materials and spare parts, lack of technology adoptability, lack of economic diversification, low level of technology adoptability and low level of concentration upon the research and development work are the main limitations faced by the manufacturing sector in Nigeria. They also stressed the supportive role of the government for manufacturing industry growth and development.

The literature review and the primary research findings also highlighted an important point that there are some issues and aspects related to the research study that are not discussed in the social research works done so far but in the primary research these issues are discussed in detail. For example manufacturing strategy and manufacturing innovation in the Nigerian manufacturing sector is not discussed in the social studies separately and in detail.

There is mostly an overall view of the entire situation presented by most of the

researchers but in this research study, the primary data came up with an in-depth review of all these issues. The views of the high level professionals operating in the manufacturing industry are used for exploring the performance of the Nigerian manufacturing sector specifically in terms of the two selected performance measures and this is the thing that was lacking in the secondary research. This gap in the literature was also identified in the review of the literature and in order to fill this gap the primary research was conducted and the missing aspects of the issues are discussed in detail with the help of the statistical survey conducted among 264 manufacturing firms of Nigeria.

There are two major literature gaps to fill with the help of the primary research. It is concluded from matching the primary and secondary researches that there is great support from the secondary findings for the primary research findings because the observations of the researchers are almost the same as the experiences of the personnel operating in the manufacturing industry of Nigeria. The same time the points missed by the researchers have also been explored with the help of the opinions of the participants of the survey.

The survey participants identified a number of problems and the possible solutions in the Nigerian manufacturing sector. They recommended adequate supply of energy resources like electricity and gas for the smooth flow of the manufacturing process. Therefore, the government and related authorities must make such arrangement to improvement the energy supply to the manufacturing industry. The railways, roads and communication network also require the attention of the authorities so that the manufacturing companies can easily conduct activities like the supply of raw material, logistics and distribution of finished goods, etc. At the same time it is also very important that manufacturing companies must give attention towards the issue of technology adaptation and there must be investment in the manufacturing sector that can enable these firms to adopt better technology and to have modern and updated technology. These were the possible solutions to the energy and infrastructural problems in Nigeria affecting the entire economy.

They also identified the need for training and skill development of the workforce in the manufacturing companies. These companies must look forward for opportunities and options through which they can arrange for attachment with overseas and multinational companies. In this way they can keep in touch with the modern manufacturing process and can also adopt some of their techniques and methods according to the requirement and capabilities of their own industry.

The participants also revealed that the present level of salaries is not attractive and this is one of the main reasons behind the lack of motivation of the workers. Thus it is also important that there must be an increment in the salaries and incentives of the workforce associated with the manufacturing sector so that they can get better facilities and incentives and can work for their companies in an efficient manner with more dedication and motivation.

The survey also established that the companies operating in the Nigerian manufacturing sector need to revolutionize their ways of operations and they should look towards new

methods and techniques of manufacturing to keep their products updated with modern technological advancements. There is a great need for be an improvement in the quality and standard of the products manufactured within the Nigerian industry so that it can satisfy the needs of the consumers in an effective manner. For this it is very important that the companies carry on their manufacturing activities with the help of updated technology and adequate and modern manufacturing processes.

The participants recommended that the Nigerian firms should focus on better marketing strategies so that they can promote their products at the domestic and international levels in an effective manner and can increase the number of consumers for the industry. In this way the sector will be able to improve on the quality of their products and market for their product which is also a hindrance to the growth and development of the sector. They also identified the government as an important player in the manufacturing sector. Therefore, the government needs to emphasise the many important issues related to the manufacturing industry and according to the focus group the government needs to work for the improvement of tariff rates in favour of the manufacturing companies within the country.

From the literature review the previous situation and current situation of the Nigeria's manufacturing sector have been highlighted. These includes the opportunities available within the manufacturing sector and the problems the sector is still facing despite the government and the private sector efforts to curb these problems. The problems and opportunities identified in the secondary sources are confirmed from the survey and the focus group interview. The survey and the focus group interview also established a number of possible solutions to the problems facing the Nigeria's manufacturing sector from the opinions given from the ground. These also provide more insight on the Nigerian manufacturing sector in relation to the manufacturing process, manufacturing strategy and innovation, environmental uncertainty, effects of technology and the significance of product design. The survey and the focus group interview identified several factors that facilitates/hinders the development and growth of the manufacturing sector in Nigeria.

The respondents from the survey posit the following as solutions to the above obstacle to the growth and development of the manufacturing sector in Nigeria. Improving infrastructure especially transport and communication facilities, enhancement and use of technology in the manufacturing sector, better salaries and incentives to the workers, improved product quality through adoption of up to date technology and manufacturing process, effective marketing and advertising, development of basic industries for the supply of raw materials, and government and private support for the research and development.

The survey tried to establish the contribution of the manufacturing strategy and innovations on the performance of the manufacturing sector and the economy at large in the Nigeria's economy. The survey also explored the manufacturing strategy used in Nigeria and whether these strategies meet the international standards. The study tried to find how the strategies used influenced the attention and loyalty of the consumers. The

survey examined the effects of technology and innovation in the manufacturing sector and product. From the findings, the survey research findings strongly support the existing literature findings and many things that are common between the studies and analysis of the researchers and the experiences of the survey participants.

In a bid to accomplish the objectives of this paper the study focused on the major research question; **'to what extent does manufacturing strategy and innovations impacts on the success of Nigerian manufacturing sector'.**

The findings of the primary and secondary research and the interpretation and analysis of these findings enabled the examination of the Nigerian manufacturing sector over the last 25 years. This examination helped to unfold various issues and topics related to the research study and after discussing the main issues of the research study, it now becomes possible to give the answers to the research questions that were set out at the beginning of the research. To find the answers to these questions is the basis of this research study because these research questions are based on the main objectives of the research as well as on the objective of filling the gaps found in the literature. There were eight questions upon which the research study is based.

This central research question was based on a gap found in the literature that many of the research studies focus on the issue of technology's impact on the manufacturing sector. But none of them identified how the developing countries, especially the least developing countries, can cope with these technological advancements and their impact. Thus the statistical survey findings are used for searching for the answer to this research question and by taking Nigeria as an example, strategies and policies are identified that can help the countries to survive in the rapidly changing and highly competitive marketplace. It is revealed from the research study that the developing counties have to remain open towards the adoptability of the latest technology, which should also be appropriate for the manufacturing process and activities of that country. The developing countries should strive to keep themselves up-to-date with the ongoing changes in the technology world so that they can make immediate changes required in their strategies and planning. For this they have to focus more and more on research and development work so that they can be aware of the technology revolution occurring in their surroundings.

Moreover the developing countries should also look towards trade liberalization measures so that FDI flow can be increased and the manufacturing companies can also take financial opportunities to invest in different fields like training and technology adaptation. Moreover the governments of the developing countries should also focus on developing infrastructure and they should also ensure the smooth flow of energy resources to manufacturing industry. Along with that the development of the basic industries is also crucial for the developing nations because through the development of their own basic industries they can save money that they have to spend on the import of raw materials and spare parts to be used in the manufacturing process. All of these measures can help the developing countries to cope with technological advancements and in this way the research study also presented the answer to this research question.

Although the literature search also identified many steps that can help the country in improving manufacturing sector performance, the view of the professionals operating in the sector is important as they are in a good position to understand as well as explain problems and solutions related to the industry. Nigeria can liberalize their trade regime by implementing policies and strategies that can encourage investors. Nigeria will also enjoy the benefits of foreign investment in terms of expenditure in research and development work, skill development and technology adaptation. Moreover Nigeria should also focus on restructuring its manufacturing strategy and innovation by following the manufacturing process and patterns of the developing countries so that there is a possibility of manufacturing products to the same standard. In this way there are many policies and strategies highlighted by the results of the research study that can help Nigeria in improving the performance of the manufacturing sector to come up to the level of other developing nations. Thus the research study also successfully provided the answer of this research question.

5.1 CONCLUSION AND RECOMMENDATIONS

The revelation from the research paper was that manufacturing innovations and strategy in the Nigerian manufacturing sector cannot be rated as high, especially when compared with other developing countries. This is because Nigeria is manufacturing products with a very low level of product design and there is also lack of innovation in manufacturing of consumer goods because there is little emphasis on the adoptability of the latest technology. The major reasons behind lack of technology adoptability is the difficulty in securing finance from different resources due to which there is little research and development work done in Nigeria in the field of manufacturing and the workers are also not skilled enough to adopt the modern technology and techniques of production.

The analysis of the research findings revealed that there is little contradiction in the findings primary research and the literature review; the opinions of the researchers and the professionals working in the field are similar to a great extent. This fact gives an assurance that the evidence collected from the business world can be placed well with the literature review in order to obtain an overview of the situation. Thus in the light of the above research findings and the identification of the major problems, there are some suggestions and recommendations formulated for the Nigerian manufacturing sector that can work to make some positive changes in the situation. These recommendations are presented in the following section.

While formulating the recommendations and suggestions for the Nigerian manufacturing sector it is observed that there are two main players in the entire situation: the government and the manufacturing firms. If there is an intention to bring improvement in the overall conditions of the Nigerian manufacturing sector then it is necessary that most of these players must make revolutionary changes in their policies, activities and strategies because the cooperation and positive attitude of both can improve the situation and the government or the manufacturing companies alone cannot do anything for the sector. Thus the recommendations and suggestions are also meant for the government and the companies operating in the Nigerian manufacturing sector and these are as follows:

5.1.1 Recommendations for the Manufacturing Organizations

The manufacturing companies of Nigeria can play a very important role in determining the high performance of the manufacturing sector if manufacturing strategy and innovations. This shows why it is important that the operators of these companies look towards strategy and innovation, among other factors that are creating problems in the sector. In order to boost manufacturing strategy and innovations, in the Nigerian manufacturing sector, the following points require the attention of the manufacturing companies' owners:

Research and Development Work: The manufacturing sector in Nigeria essentially requires research and development work because the current manufacturing process and strategies adopted by the manufacturing companies are not at international level due to which Nigeria has failed to be competitive. In this regard it is necessary that the manufacturing sector must conduct adequate research and development work so that they can be aware of the new technologies and techniques of manufacturing that can raise the quality and standard of their products and at the same time allow them to reduce the cost of production of their manufactured goods.

Technology Adoptability: Manufacturing sectors all over the world are going through phases of revolutionary changes as they strive to keep themselves aligned with the changes occurring in their surroundings. This alignment helps to be competitive as well as cost effective at domestic, regional and international level, however in the case of Nigeria it is observed that manufacturing firms are not paying attention to technology adoptability and they are manufacturing products with their traditional process and techniques. As a result the cost and time of production is still high in the sector and the manufactured products are generally not at international level.

Skill development and Training of the Workers: The research study has revealed that in the Nigerian manufacturing sector there is little emphasis given to the skills development and training of the workforce. This is also an important reason for the trend of innovation and technology adoptability being very low in the sector. In this regard the owners and the decision making personnel working in the Nigerian manufacturing sector must make some arrangements for the training and skills development of their workers. In this regard the manufacturing companies should arrange workshops and training s for their employees within the country as well as abroad.

Pay Scales and Incentives for the Workforce: The present pay scales and incentives given to the workforce of Nigeria are not significant enough to motivate the workers, so the Nigerian manufacturing companies must revise the pay scales of the workforce and should also give some incentives and facilities to the workers so that they can be motivated to work for improvement in the performance of the sector. At the same time good salaries and incentives will compel the workers to perform well and to adopt new techniques and methods of manufacturing in their companies. Thus increments in the pay scales of the workers and incentives can also work for the betterment of the situation and the operators of the Nigerian manufacturing sector should also concentrate on this issue.

Restructuring the Manufacturing Process and Strategy: The results of the research

that the manufacturing strategies and manufacturing processes followed by the manufacturing sector are not at international level and there is an essential requirement for updating the system and strategy. In this regard the supervisors and authorities of the manufacturing industry are required to adopt and follow the manufacturing system and manufacturing process in accordance with the requirements of the modern system and for this they are required to do research and development work, technology adoptability as well as to focus on the training and skills development of their workers.

Focusing on Quality and Cost Reduction Measures: The quality and standard of the manufactured products is the most important attribute that assures the success and popularity of the products. At the same time the price of the product should also be kept at the lowest possible level to attract more consumers and countries towards the product. In the Nigerian manufacturing sector the cost of production is very high in the manufacturing sector because of the importing of raw materials and spare parts. The manufacturing companies should look towards other ways that can help them in reducing the cost of manufacturing the products and for this they can get help from the research and development work.

The key objectives of the research study are all achieved successfully through the employment of a mixed methodology research approach; however there were some limitations and problems during the research study. First of all there are little authentic data available related to the manufacturing sector growth and development in Nigeria, due to which the research study has to rely upon the research conducted by different researchers and these research studies mostly describe the facts rather than providing much in the way of figures and statistical data. In addition to this there were major problems faced in collecting responses from the CEOs and other personnel of the manufacturing firms of Nigeria. The research study has conducted an examination of the Nigerian manufacturing sector in detail with the help of two performance measures; however there are some very important areas that still need adequate research work so that the Nigerian manufacturing sector will be further benefited. In this regard it is very important that along with keeping in mind all the limitations and problems of the Nigerian manufacturing sector, the researchers should look towards the methods and techniques that can help the Nigerian manufacturing companies in reducing their cost of manufacturing the products and while having the same financial resources they can also go for the advanced techniques and methods of manufacturing.

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Environmental Factors Affecting the Nigerian manufacturing Organizations

U M Mustapha, S Goh and H Ku
Faculty of Engineering and Surveying, University of Southern Queensland,
West Street, Toowoomba, 4350, Australia

Corresponding Author:
Title : Dr.
Name : Harry Siu-lung Ku
Affiliation : Faculty of Engineering and Surveying, University of Southern Queensland.
Tel. No. : (07) 46 31-2919
Fax. No. : (07) 4631-2526
E-mail : ku@usq.edu.au
Address: Faculty of Engineering and Surveying, University of Southern Queensland,
West Street, Toowoomba, 4350, Australia.

Abstract

The manufacturing organizations in Nigeria are performing significantly low for many years owing to various environmental factors. Many research studies have been conducted but only few have directly addressed the issue. Hence, this research is motivated in identifying the key environmental factors affecting the Nigerian manufacturing organizations and brings forth some recommendations which can enhance the performance of the manufacturing sector. For this purpose, a quantitative statistical survey was conducted with the help of a structured questionnaire, which received 254 responses from the manufacturing firms in Nigeria. Also, a qualitative focus group interview was conducted by identifying 10 experts from the manufacturing industry. The results of the survey and the focus group interview revealed that lack of funds, inadequate infrastructure, less government patronage and non-adaptability to technological advancements are the key factors impeding the growth and development of the Nigerian manufacturing sector. The research recommended that the manufacturing companies in Nigeria should adapt to the advancements in technology, reform their manufacturing systems and process, invest on research and development work, focus on training and skill development of their workers and increase the salaries and incentives of their workforce to assure their survival in this highly competitive market. The research also recommended the Nigerian government to encourage investors, develop basic industries, improve infrastructure and implement favourable policies to create a better operating environment for the manufacturing industry. The research concluded that both government and manufacturing companies must co-operate in making revolutionary changes in their policies, strategies and activities to improve the overall condition of the Nigerian manufacturing sector.

Key words: Environmental uncertainty, Nigerian manufacturing sector & business environment

INTRODUCTION

The manufacturing organizations in Nigeria are experiencing a slow growth rate due a multiple of factors that are political, economical, social, technological and environmental in nature. There have been many researches conducted in order to identify the reasons behind the low performance levels in manufacturing sector but only few studies have directly focused on the environmental factors with facts and figures. Hence, this paper is aimed at identifying the key environmental factors behind the decimal performance of the manufacturing organizations in Nigeria so that efforts can be made to overcome these barriers or minimize their negative effects. Thus, the main purpose of paper is to provide suggestions so that a better manufacturing environment in Nigeria can be achieved for the purpose of improving the performance of the Nigerian manufacturing sector, which could also lead the country towards the path of greater economic growth and development.

REVIEW OF RELAVANT ENVIRONMENTAL UNCERTAINTY LITERATURE

Environmental Uncertainty refers to such situations as when the management of a firm faces some major difficulties in order to take decisions related to their future activities and functions because they have a very unclear picture in front of them as they have very little information related to the external environment. When due to any socio-political or economic issue the business scenario of any country becomes unpredictable and the business firms operating in the country also become uncertain about their future and their normal operations are affected due to the fact that they are not in a position to take decisions about the company activities that need stable environmental conditions. When such a situation is encountered by business organisations they face challenges in making their decisions, solving business related problems, designing their strategies and deciding the management and leadership issues and subjects (Evangelista, 2000).

Fagerberg (2004) explains that environmental uncertainty is that condition when the managers of the businesses do not have sufficient information about the environmental factors, due to which they remain unable to understand or predict the needs and changes required in the environment. For the manufacturing sector environmental uncertainty refers to uncertainty in the economic, socio-cultural, technological and legal environment that hinders the management in taking effective action for the business and as a result the entire productivity and revenue of the manufacturing sector is badly affected.

In this regard, it is necessary that the manufacturing companies must be equipped with such skills that can help them in adopting and responding to the rapid changes occurring in the environment. Olukemi (1993) conducted research to find out the relationship between environmental uncertainty perception and environmental scanning behaviour of the CEO of 47 manufacturing firms operating in Nigeria. The research was intended to find the role of the environmental uncertainty in the performance and development of the Nigerian manufacturing sector. It is revealed from the research that perceived environmental uncertainty plays a vital role in determining the performance of the manufacturing companies of the countries and both the economic and political legal sectors of the environment used to be salient for Nigerian manufacturing executives.

Sabherwal (1999) conducted an empirical study in order to find evidence about the relationship between environmental uncertainty and business performance. The study came up with the conclusion that uncertainty within the environment has a strong impact on businesses and it affects several strategic operations and planning of the company. The strategic implications of a business highly depends upon the stability of the environment and when the management face an unpredictable situation led by environmental uncertainty then the strategies and planning of the company failed to progress as desired.

The successful implementation of the strategic decisions and plans of the business is necessary that the business must get support from the surroundings. The stability and certainty in the environment helps the companies to be competitive and survive even in challenging situations. Thus the relationship between the performance of a business and environmental uncertainties are found to be strongly negatively related to each other. The rise in environmental uncertainty declines with the performance level of the firms whereas certainty and stability in the environment work for the better and high quality performance of a business (Sabherwal, 1999).

Amit (1993) conducted an empirical study to measure the impact of environmental uncertainty on the SMEs' functions, their performance and product designs. The researchers selected the existence of "dynamism, complexity and hostility" in the environment as measures of environmental uncertainty and analyzed the employment data of the Scottish and Northern English SMEs. Both manufacturing and service firms were selected to find the evidence about the impact of environmental uncertainty on the performance of each of these types of firms. It is found from the study that the service firms and manufacturing firms encounter the effects of environmental uncertainty in different ways.

The results related to environmental uncertainty on manufacturing firms show that when the manufacturing companies face uncertainties related to the functioning of their suppliers then their manufacturing process as well as their level of innovation is strongly affected. In this way, it is proved that environmental uncertainty can prevent the product design innovation process within the manufacturing sectors and in order to assure the high quality and innovative performance of the manufacturing sector, the responsible forces must work to assure environmental certainty so that the manufacturing companies can carry on their product design and other activities by expecting predictable results and the economy can also get support from productivity and the innovative product designing of the manufacturing companies.

Selto, et al., (1995) threw light on some of the negative effects that environmental uncertainty can draw upon the businesses, in particular on the manufacturing firms. It is explained by the researchers that when uncertainty existed within the surrounding environment, then the management of the manufacturing companies found that they lacked sufficient information about the environmental factors and as a result they were not in a better position to make predictions about their emerging needs due to the changing environment. It is necessary that the companies must have adequate information about their surroundings so that they can foresee their requirements in case of any environmental changes but when insufficient information about their surroundings prevents them from making such predictions, then the overall performance and strategic decisions of the firms are badly affected.

The environmental factors like pollution, legal issues, social instability and complexities have the capability to influence and affect the operations of the manufacturing firms and the management of the manufacturing firms is supposed to develop their strategies and plans to counter any of these problems. However the management must have deep insight over the entire situation because a clear understanding of the environment can enable them to develop such plans that can work for the manufacturing firms in case of any environmental problem. When the management lacks information then the plans and policies are not designed adequately to safeguard the manufacturing firm in any problematic situation and ultimately the performance and work quality of the company declines. In this way the researchers explained the negative consequences of environmental uncertainty over the performance and work quality of the manufacturing companies.

Black (1994) observed that the managerial qualities and skills of the manufacturing sector personnel can play an important role in determining the extent to which environmental uncertainty can affect the

performance of the manufacturing company. In this regard, there is great importance that the managers of the manufacturing companies make some arrangements that can inform them as to any such environmental change that can affect their functions and activities. For this it is necessary that the manufacturing companies must have adequate information and understanding of their surroundings and that they are in a position to predict any change that might occur in their environment. If the management succeeds in making predictions about the expected changes in the environment it will be very easy for the manufacturing company to cope up with the challenges resulting from those changes as they can design the strategies that can work to prevent the negative affects of those expected environmental changes.

Miller (1996) pointed out that environmental uncertainty can be handled in an effective manner if the management of the company have made some changes in the functions and activities of company so that the negative effects of the uncertainty could be minimized. It is important to understand that changes occur in the environment very rapidly and the manufacturing sectors have to be prepared to face these changes; they should also be ready to make any structural or functional changes in their business. In this regard the manufacturing companies also have to work towards integration and collaboration with different components of the market place so that this can help to face the uncertainties of the environment.

The formation of different alliances, umbrella organisations and other forms could be a helpful step for the manufacturing sector because through these forms they can share information with each other and as a result they can form better policies and strategies that can help in case of any uncertain conditions. The manufacturing companies individually cannot secure as much information as they can secure and share at common form so steps must be taken for the unity of the manufacturing sector where different ideas and information could be shared and the negative effects of environmental uncertainty could be reduced. For this purpose the legal alliances and the joint ventures can also work for the improvement of the situation (Miller, 1996).

Russo (1997) observed that it is very important for the manufacturing sector to keep an eye on environmental factors because the manufacturing sector is regarded as a highly dynamic environment and different components, parts and materials used in the manufacturing process are at higher risk of seeing the impact of any change occurring in the environment. The changes in environmental factors might result in changes of demand and supply patterns of any raw materials at domestic or international level and the manufacturing companies have to be prepared to make changes in their demand and supply patterns in such a way that they can respond to the changes occurring in the domestic or global scenario. For this reason, the manufacturing companies must be flexible enough in such a way that they can make changes in their manufacturing process and strategy so that they can manage with the changed supply patterns of the raw materials and can still sustain their regular manufacturing operations and activities to the same quality and standard.

Brown & Hicks (1995) explained that the flexibility of the manufacturing companies has a major role to play in the situation where the manufacturing sector faces environmental uncertainty. When there are some changes in environmental factors closely linked with the manufacturing industry, then the manufacturing operations are likely to be influenced by these changes. If the manufacturing firm has developed such strategies that make the company flexible with respect to its demand and supply requirements, then the company can easily face these changes, whereas lack of flexibility can cause several problems for the company and their routine manufacturing activities can also be badly affected.

Teo (1997) observed that there are many cases found in the manufacturing sector that clarified the

effects of environmental uncertainty on manufacturing companies. In particular, product design and innovation within the manufacturing sector is badly affected due to environmental uncertainty. The researchers explained that environmental uncertainty can affect the manufacturing sector in terms of dynamism as well as heterogeneity. In both cases routine operations and activities of the manufacturing company are disturbed and the innovation process also faces certain barriers due to which overall innovations in the product designing go on declining.
Zviran (1990) explains that the manufacturing sector has to remain in direct interaction with the surroundings for the supply of raw material and facilities and then for the provision of the finished products. During this entire interaction there are certain opportunities and threats that are transferred to the manufacturing companies from the environment; in order to face these threats in depth information and understanding of environmental issues is necessary for the manufacturing sector. In case of lack of detailed information the decision making process of the manufacturing sector is affected due to which the performance of the company declines (Teo, 1997).

The review of the research studies presented above explains in detail the issue of environmental uncertainty in connection with manufacturing sector performance. It becomes clear that the manufacturing sector sees the direct effects of environmental conditions because due to the nature of its work, the sector remains in interaction with the environment for getting different raw materials and facilities. Due to this interaction the threats of environmental uncertainty are also higher for the manufacturing companies and the most effective way to overcome these problems is to have deep and clear understanding of the surrounding environment (Zviran, 1990).

For this reason, it necessary and sufficient that the manufacturing sector of Nigeria has adequate and detailed information about the environment in which it operates including the barriers it face within the environment. Therefore, it is worth studying environmental uncertainty because of its direct effects on the performance of the manufacturing sector and the economy as whole. In order accomplish the objective of the paper the following research question is answered: *What are the environmental factors affecting the Nigerian manufacturing organizations?*

RESEARCH METHODOLOGY

The research employed a mixed methodological approach comprising of quantitative questionnaire survey and qualitative focus group interview. The survey was conducted with a structured questionnaire using the Likert scale to measure either positive or negative responses to a statement as well as traditional open ended questions. A list of 400 manufacturing organizations was drawn from the Directorate of Nigerian Manufacturers Association of Nigeria (MAN) which included firms in the food, pharmaceuticals, health care, automotive, chemical, petrochemical industries and so on. The questionnaire was sent to the CEOs and the head of the manufacturing departments of the selected organizations so that the respondents have a certain degree of authority to take final decisions. Finally, there were 254 completed questionnaires accepted for the survey. The data gathered from the 254 responses were then placed in statistical software including Excel for calculation and further analysis.

Further, focus group interview was conducted by identifying 10 experts from the Nigerian manufacturing sector. The process of selecting the 10 focus group interview participants was mainly based on their knowledge and experience which includes academic background, number of years spent in manufacturing function, number of countries worked and geographical spread within Nigerian regions including working experience in multiple sub-sectors of the Nigerian manufacturing sector. The purpose is to interject probing comments, offer transitional questions and cover important topics and this is done in a way as not to influence or interrupt the natural discussion of the respondents within the group. To conduct the focus group interview with the 10 selected manufacturing experts, a semi-

structured interview technique was used, which comprised of 10 questions. After each question, the group interviewees were allowed to answer the question using their own initiative and where the answer appears to be ambiguous or off target of the research, further probing questions were asked.

RESEARCH FINDINGS

The results of the statistical survey are presented separately for each question and then collectively for every section. The graphs are used to further clarify allowing viewing the results of the survey at a glance. Further, the individual and collective results of the focus group interview are also explained in detail.

Research Findings from the Questionnaire Survey

The questionnaire used for the study consists of seven questions related to environmental uncertainty in the Nigerian business environment and its effect on the operations and activities of the Nigerian manufacturing sector. Following are the results obtained from section II of the questionnaire:

Question 1: *To what level is the current business environment and market structure of Nigeria satisfying and supporting the manufacturing activities?*

In reply, 6 (2%) of the respondents that replied Very High, 6 (2%) said High, 6 (2%) said Medium, 50 (20%) said Low and 184 (74%) said Very Low. It is indicated from the results that in the view of the respondents of the survey, at present the business environment of the country is very low in supporting manufacturing activities. The result is also shown in chart 1.

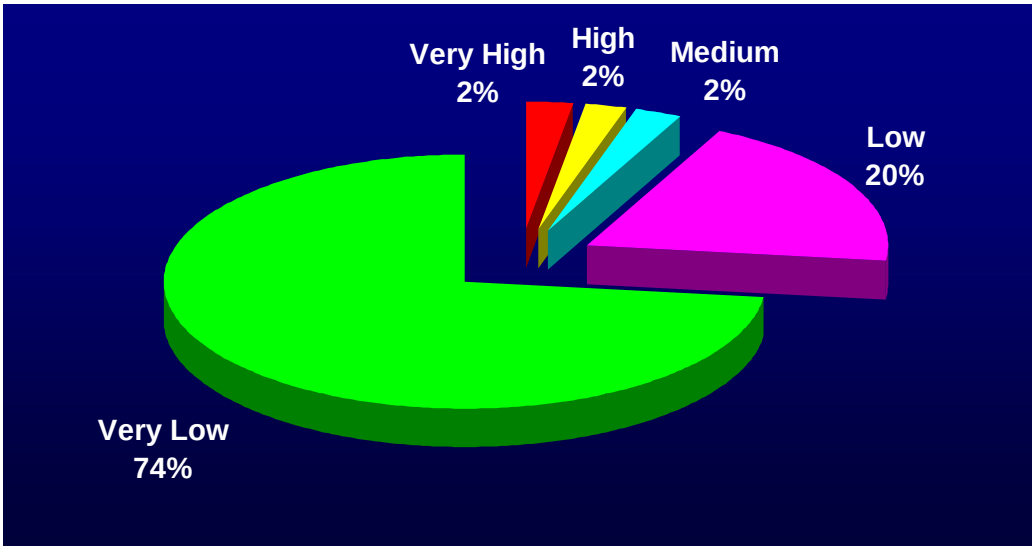

Chart 1: Current business environment and market structure of Nigeria in satisfying and supporting the manufacturing activities

Question 2: *To what extent has the level of Nigerian environmental uncertainty reached where the manufacturing activities are adversely affected?*

In response, 186 (73%) of the respondents said Very high, 60 (24%) said High, 8 (3%) said Medium, 0 (0%) said Low and 0 (0%) said Very Low. The results of this question also indicate that the participants of the survey think that environmental uncertainty in Nigeria has reached a very high level where it can strongly affect manufacturing sector activities, operations and development. The result is also shown in chart 2.

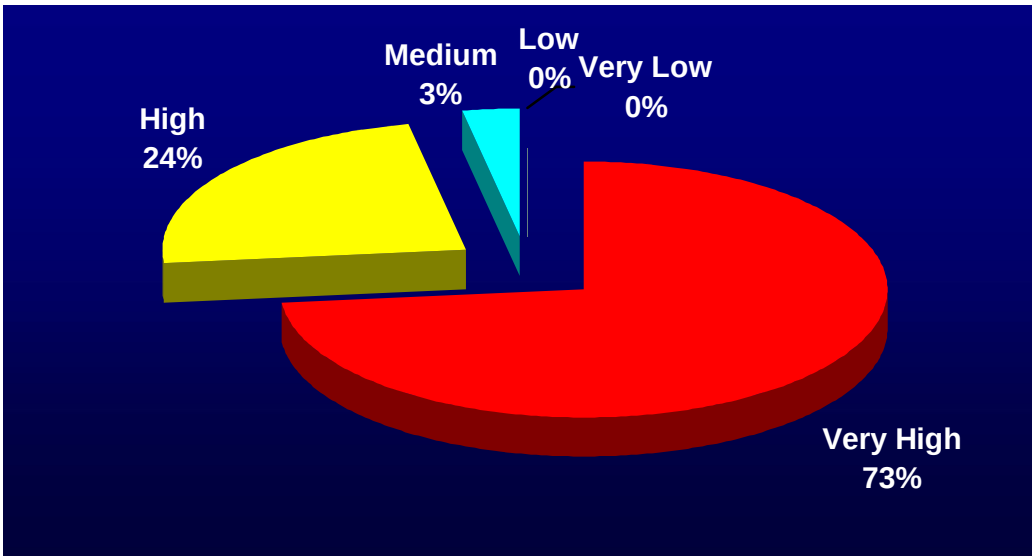

Chart 2: Extent to which Nigerian environmental uncertainty adversely affecting the manufacturing activities

Question 3: *To what level has the non availability or difficulties in getting finance and credits hindered the growth and high quality performance of Nigerian Manufacturing firms?*

In reply, 254 (100%) of the respondents said Very High. The results of this question came up with a very clear answer that all of the participants of the survey share a common belief and have no differences on the matter that the unavailability of financial resources is an important barrier to the growth of the manufacturing sector in Nigeria. The result is also shown in chart 3.

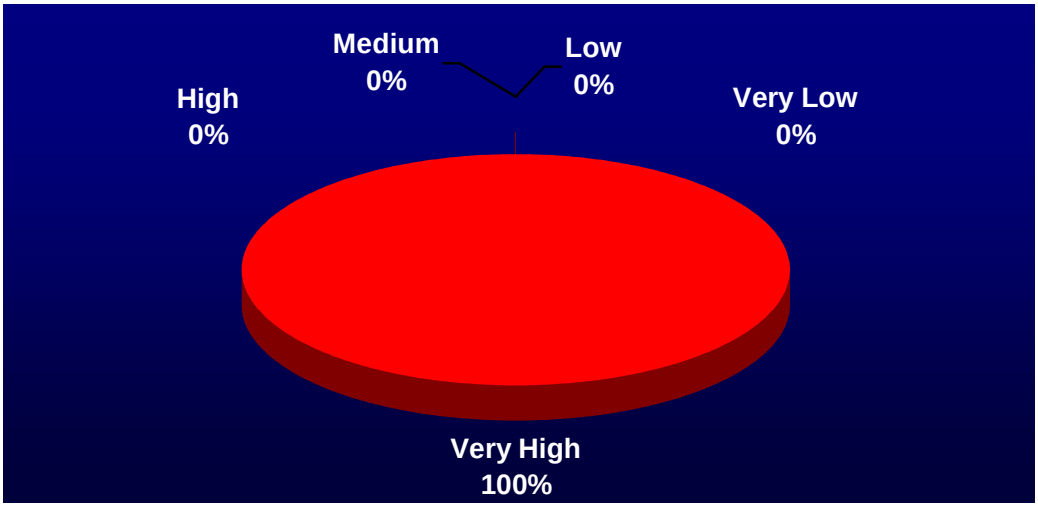

Chart 3: Non availability or difficulties in getting finance and credits hindering the growth and high quality performance of Nigerian Manufacturing firms

Question 4: *To what extent is socio-political environment of Nigeria supportive of manufacturing activities?*

In response, 0 (0%) of the respondents said Very High, 0 (0%) said High, 4 (2%) said Medium, 66 (26%) said Low and 182 (72%) said Very Low. The answers make it clear that the respondents of the survey strongly believe that the manufacturing sector is very little supported by the socio-political environment of the country. The result is also shown in chart 4.

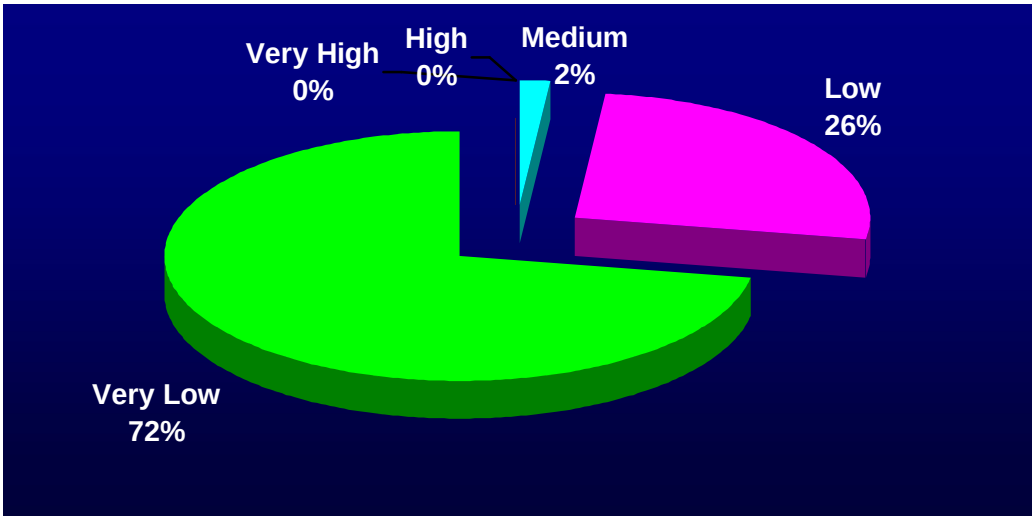

Chart 4: Extent to which socio-political environment of Nigeria supportive of manufacturing activities

Question 5: *To what extent do you think some degree of improvements could be achieved through government support for a stable and suitable environment for the manufacturing activities?*

In reply, 144 (56%) of the respondents replied Very High, 68 (27%) said High, 36 (14%) said Medium, 4 (2%) said Low and 2 (1%) said Very Low. These results show that most of the participants believe that the government can play a role in the situation as government steps can make high level changes in the entire situation. The result is also shown in chart 5.

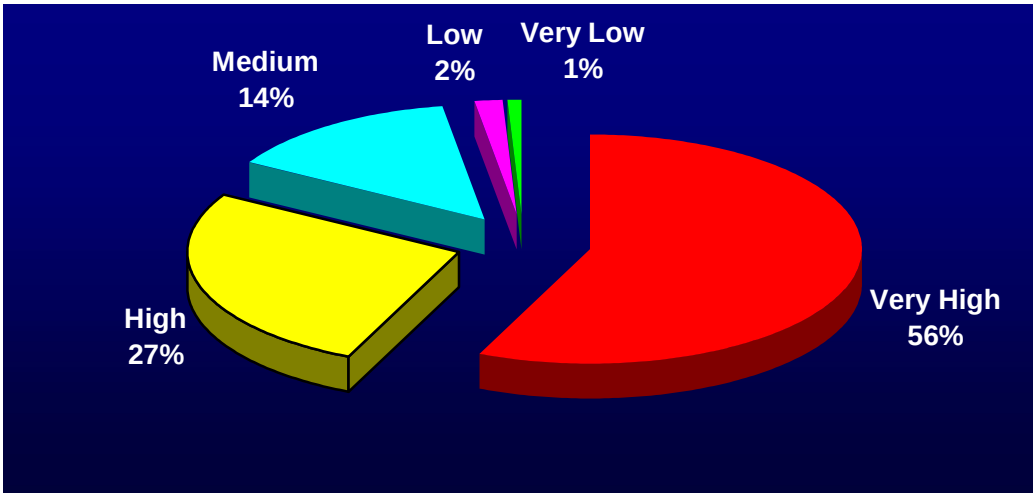

Chart 5: Extent to which some degree of improvements could be achieved through government support for a stable and suitable environment for the manufacturing activities

Question 6: *What level of influence do the foreign products have over the operations of the Nigerian manufacturing firms?*

In response, 186 (73%) of the respondents said Very High, 56 (22%) said High, 8 (3%) said Medium, 2 (1%) said Low and 2 (1%) said Very Low. The results show that most of the participants believe that

foreign products highly influence the operations of manufacturing firms in Nigeria. The result is also shown in chart 6.

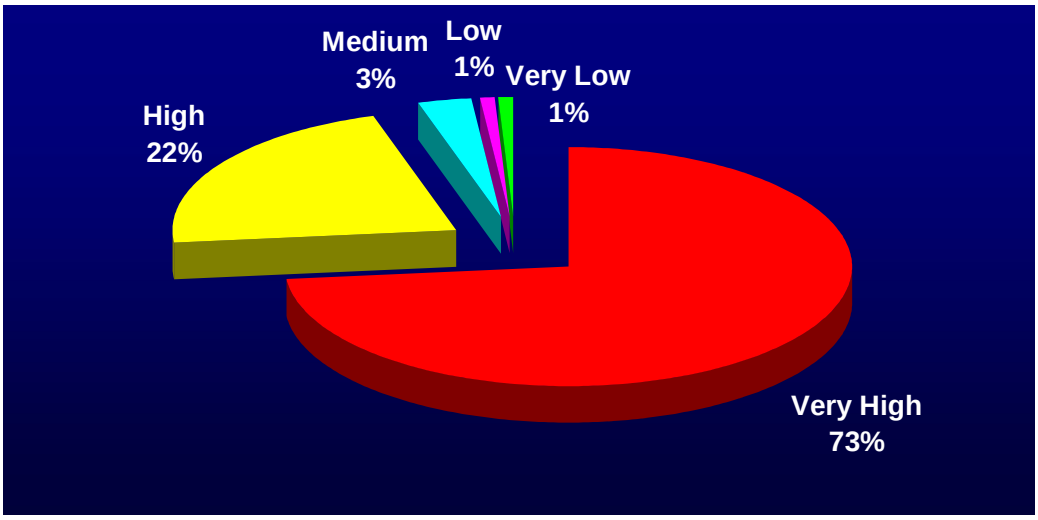

Chart 6: Influence of foreign products over the operations of the Nigerian manufacturing firms

Question 7: *To what extent are Nigerian manufacturing firms open towards adopting rapid environmental and technological advancements?*
In reply, 132 (52%) of the respondents said Very High, 102 (40%) said High, 12 (5%) said Medium, 6 (2%) said Low and 2 (1%) said Very Low. The results indicate that many of the participants of the survey see a very high level of openness in the Nigerian manufacturing sector with regard to the adaptation of new technology. The result is also shown in chart 7.

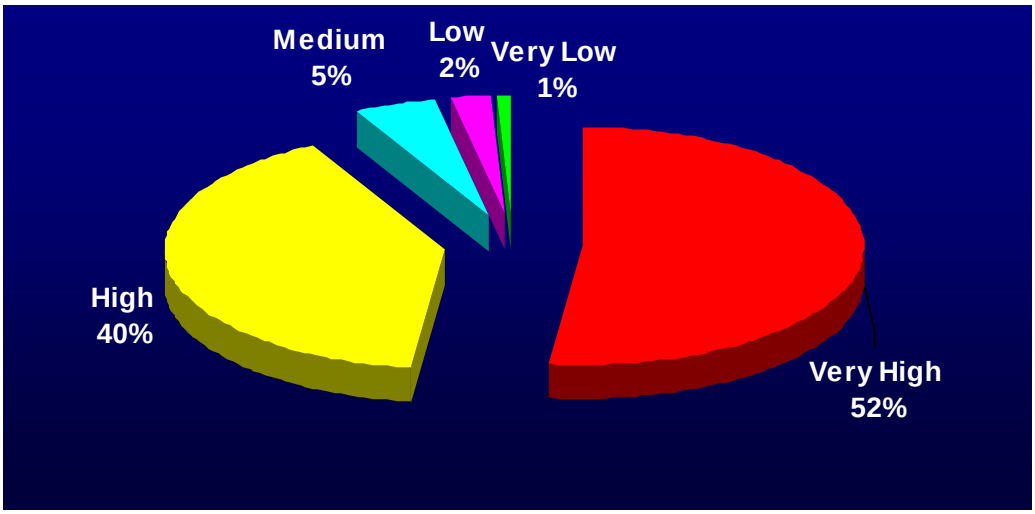

Chart 7: Extent to which Nigerian manufacturing firms are open towards adopting rapid environmental and technological advancements

Combined Result of the Survey: All the seven questions of survey were calculated separately as well as combined, to get the overall opinion of the respondents about environmental uncertainty and its effects on the Nigerian manufacturing sector. According to the combined calculation, 908 (51%) of the respondents said environmental uncertainty prevailing in the business environment of Nigeria effects

the companies operating in the Nigerian manufacturing sector Very High. According to the opinion of 292 (17%) respondents the environmental uncertainty affecting level is high, 74 (4%) regarded it as medium, 128 (7%) low and 372 (21%) very low. The combine result is also shown in chart 8.

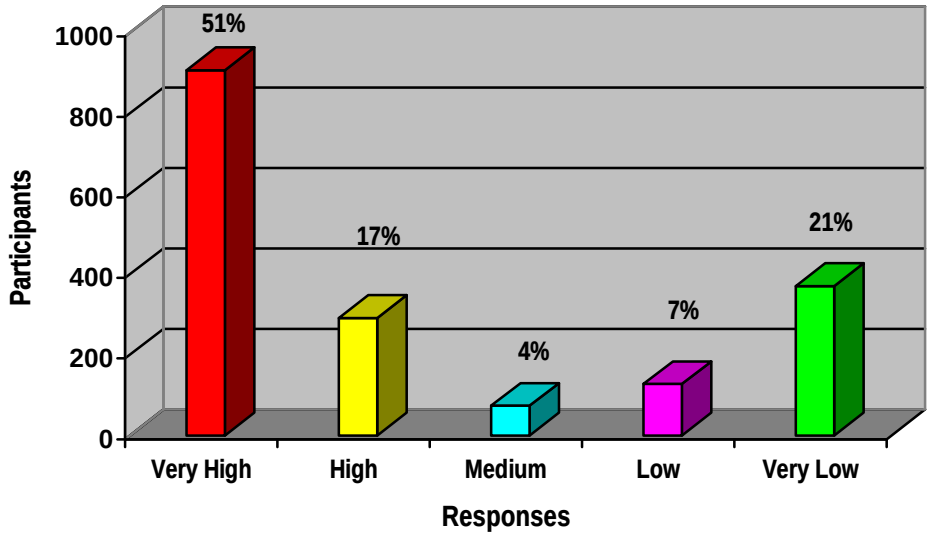

Chart 8: Overall opinion of the respondents about environmental uncertainty affecting the Nigerian manufacturing sector

It is revealed from the combined results of this section that in the opinion of the participants of the survey environmental uncertainty in Nigeria has reached a very high level and along with socio-political instability it is very unsupportive for the development of the manufacturing sector in Nigeria. It is also found that the participants of the survey see a high level of influence of foreign products on the Nigerian manufacturing sector and they believe that the Nigerian sector is very open to the adaptation of new technologies and machinery in their manufacturing process. Availability of finance is also identified as the most important barrier for the development of the manufacturing sector by all of the participants of the survey.

Research Findings from the Focus Group Interview

Question 1: *Distinguished participants, can you briefly introduce yourselves with special emphasis on your experience as it relates to the environmental challenges in the Nigerian Manufacturing sector?*

The first question collected details about the participants' work experience in the manufacturing industry in Nigeria as well as in the international market. From their individual responses, it is established that they are currently having manufacturing experience that ranges form 25 years to 40 years and two of them have worked in at least five different countries including China, India, Malaysia, Germany and many other leading African countries. They also have experience of working under different policy regimes in Nigeria. To maintain confidentiality, the real names of the participants were not disclosed and some codes were used for identification

Question 2: *What are the major environmental challenges currently facing the Nigerian manufacturing companies?*

Lack of infrastructure facilities, lack of funds and difficulties in availing loans, lack of appropriate

technology, overseas dependence for supply of raw materials, strong competition from countries like China and India, lack of government support and inconsistencies in their major policies, consumers' preferences for foreign products, multiple taxation and other charges, low purchasing power of the consumers and Nigerian workers preferring overseas jobs were the most common and agreed upon challenges for the Nigerian manufacturing sector.

Question 3: *To what extent do you perceive the environmental factors that are impediments to the performance of the Nigerian manufacturing organizations as internal factors that is factors within the control of the organization?*

The factors identified by the participants that are impediments to the performance of the Nigerian manufacturing organizations within the control of the organizations are lack of basic infrastructure facilities, lack of funds, lack of modern machinery and equipments, low salaries and incentives, lack of adoption to updated technology and manufacturing processes, lack of research and development work and lack of training and skill development of the workforce.

Question 4: *To what extent do you perceive the environmental factors that are impediments to the performance of the Nigerian manufacturing organizations as external factors that is factors outside the control of the organization?*

Lack of funds due to non-availability of loans, lack of infrastructure facilities, lack energy resources and power supply, lack of government support and inconsistencies in their policies, lack of supply of raw materials, lack of government support for research and development work, corruption hindering the inflow of foreign investments, multiple taxation, fees and other charges and decline in the purchasing power of the consumers were identified as the key factors impeding the performance of the Nigerian manufacturing sector, which are outside the control of the organizations.

Question 5: *What are the key environmental factors confronting the manufacturing firms of Nigeria in maintaining high performance at domestic level?*

Lack of energy resources and adequate power supply, lack of appropriate machinery and equipment, lack of government patronage, inadequate capital, lower consumer spending power, high manufacturing costs and inadequate options in terms of raw materials procurement were identified by the participants as the key factors confronting the manufacturing firms in maintaining high performance at domestic level.

Question 6: *What are the main influential environmental factors that hinder the high quality performance and growth of the Nigerian manufacturing sector at international level?*

In reply, the participants identified lack of government support providing the tariff rates in favour of the manufacturing companies, lack of basic infrastructure facilities, lack of development in basic industries which forces the procurement of raw materials from overseas, lack of adoption to advancement in technology, lack of modern manufacturing design, processes and strategy to compete in the international market, lack of capital availability and rise in competition from other developing countries as the influencing factors that hinder the high quality performance and growth of the Nigerian manufacturing sector at international level.

Question 7: *Do you think the present situation has become more challenging and demanding for the Nigerian manufacturing firms as compared with past 10 – 15 years?*

More than 90 percent of the respondents believe that due to the increasing challenges and demands of the emerging situation, many of the manufacturing companies are struggling for their survival and manufacturing is also declining in the country as there are many new and challenging problems in the operating environment.

Question 8: *Do you think that as compared with last 10 – 15 years, the Nigerian manufacturing sector will face more challenges and demanding situation in the coming 5- 10 years?*
The participants expressed their opinion in favour of the fact that a rise in competition and technology advancement has brought many difficulties for the manufacturing firms of Nigeria. They also have many difficulties in aligning their operations and activities in accordance with the changes occurring at international manufacturing industry. The respondents also share their opinions that in this situation it is necessary that the basic infrastructure of Nigeria must be improved and developed to support manufacturing activities otherwise there are possibilities that the manufacturing environment of the country will further deteriorate. The manufacturing sector is in great need of support in terms of capital availability, increased local manufacturing by introducing tariffs, manufacturing incentives, etc.

Question 9: *Based on your knowledge and experience, to what extent do you see the level of difference in the environmental conditions within Nigerian manufacturing sector as compared with those of China, India and Malaysia?*
It was found that when the professionals operating in the Nigerian manufacturing sector compared the manufacturing industry of Nigeria with that of China, India and Malaysia they found that the operating environment of Nigeria contains lot of uncertainty. That is the most important factor in weakening the performance and growth of the Nigerian manufacturing sector. For example, they cited example like around late 1990s and early 2000s, interest on loan to manufacturing business in Nigeria was as high as 28% against the average of less than 10% in these 3 countries.

Question 10: *Finally distinguished participants, what are your recommendations and suggestions that the Nigerian manufacturing establishments and Nigerian government have to emphasise, which will bring improvement in the overall state of the Nigerian manufacturing sector?*
The experts from the focus group interview suggested that Nigerian manufacturing organizations should adapt to advancements in technology and to have modern and updated machinery. The manufacturing companies should also invest more on the research and development work. It was also recommended that the workforce should be motivated by increasing the salary and incentives so that they can work with more dedication. The manufacturing sector should look towards new tools, techniques and methods to keep the products updated and competitive. The participants also suggested that the manufacturing firms should provide the necessary training to improve the skills of the workforce.

According to the experts, the government should focus on developing the basic industries which will help in procurement of raw materials locally. The government should encourage the investments in the manufacturing sector through liberalization and ensure proper management of funds. It was emphasised that there should be focus on developing the basic infrastructures such power generation, supply of energy resources, railways, roadways and other communication facilities. The experts suggested that the government should implement necessary policies in improving the tariff rates in favour of the manufacturing companies.

DISCUSSION OF RESEARCH FINDINGS
The uncertainty in the environment has proved to be an important and influential factor that can harm the activities and performance level of any business or industry. In order to examine the performance of the Nigerian manufacturing sector, the uncertainty in the business environment of Nigeria is also studied and analyzed to trace the impact of this factor on the performance of the manufacturing industry. The survey questionnaire was dedicated with questions about the impact of environmental uncertainty on the performance of the Nigerian manufacturing sector. With the help of the seven questions, the responses of the survey participants are collected regarding the environmental uncertainty in the Nigerian manufacturing sector. It is revealed from the survey results that the survey

participants are not satisfied with the business environment of Nigeria and they think that there is very low support for manufacturing sector activities from the environment of the country due to which the activities of the manufacturers are also negatively affected; this supports the study conducted by Sabherwal (1999). At the same time, all of the survey participants also strongly agree with the fact that there are not adequate financial resources for manufacturers in Nigeria due to which the performance of the sector is also very low.

Moreover, there is no support from the socio-political conditions for manufacturing companies. Instead, there is instability in the business environment due to which the companies' owners remain uncertain in taking important decisions about their operations and activities. At the same time, it is also realized by the survey respondents that if the government of Nigeria takes some positive steps towards bringing stability in the business environment then the activities and performance level of the manufacturers will be affected very strongly, this findings has been reported since 1993 by Olukemi (1993) but it is still on. There is another threat in the business environment of Nigeria in the form of foreign products because in the presence of the foreign manufactured products the level of Nigerian manufacturing products seems even lower. This is because foreign products are of a high standard in product design and innovation and the market value of the Nigerian manufactured products goes down further in the presence of advanced manufactured foreign products.

The only hope of the survey participants in the Nigerian manufacturing sector is the openness of the Nigerian manufacturing owners towards the adoption of technological changes due to which the participants think that some improvement can be brought to the sector. Thus it is revealed from the answers of this section that environmental uncertainty exists in the business environment of Nigeria at a very high level and this factor is influencing the performance and productivity of the Nigerian manufacturing sector. The uncertainty is evaluated in terms of difficulties in getting finance from different institutions and the participants of the survey have strongly agreed upon this matter that in Nigeria there is lack of availability of sufficient financial resources. Finally, it is revealed that the high level of uncertainty in the business environment of Nigeria is among the important factors that contribute towards the decline in the performance of the sector.

According to the experts who participated in the focus group interview, there is need for improvement in the basic infrastructure facilities such as the railways, roadways and communication. Lack of energy resources and inadequate power supply is hindering the high quality performance of the manufacturing sector. The sector needs to adopt better technology to ensure new and modern machinery and equipments which will help in improving and maintaining a high performance standard in the domestic and international level. At present, the manufacturing sector is not open towards the usage and adoption of technologies and skills and hence, there is stagnation and negative impact on efficiency of the sector, The experts were of the opinion that there is need to improve the quality of products, reform the marketing strategy and manufacturing processes by adopting the updated technology. Inadequate capital is a main factor hindering the high quality performance of the Nigerian manufacturing sector. Lack of government support in developing the basic industries has lead to insufficient supply of raw materials. The manufacturing companies are forced to procure the raw materials from overseas which resulted in high manufacturing costs.

Inconsistent government policies and multiple taxations and other charges have also lead to high manufacturing costs. The private sector players also failed to contribute in the manufacturing industry due to import barriers, tariffs, licenses and other policies which resulted in unavailability of raw materials. The experts also highlighted that there is gross under utilization of resources and very low capital utilization in the manufacturing sector due to frequent power problems, decline in demand for

the manufactured products and frequent strikes and lockouts by the workers and also the employers. The participants also felt that the Nigerian government and public, private and multinational organizations should support and fund the academic research and development work by the universities and institutions, which will help in reviving the declining manufacturing sector.

A close look at the identified environmental barriers as observed from both the survey and experts' group interview shows that some of the factors are external to the organizations like the issue of inconsistency in government policies while some are within the organizations themselves although they always attempt to make them external like the issue of finance. Also, the findings of the research has fully provided an answered to the research question, which is an attempt to identify and make suggestions on environmental uncertainty factors within the Nigerian manufacturing business.

CONCLUSIONS AND RECOMMENDATIONS

The research study aims to put forward some recommendations for the Nigerian manufacturing sector that are expected to make the operating environment of the sector better and more supportive for economic growth. To bring improvement in the overall conditions of the Nigerian manufacturing sector, it is necessary that both the government as well as the manufacturing companies must make revolutionary changes in their policies, activities and strategies because the cooperation and positive attitude of both can improve the situation.

The diversification of the economy towards the non-oil sector would be the most significant and positive step towards the development and improvement in the growth level of manufacturing industry in Nigeria. The Nigerian government must work to encourage foreign investors by showing them different investment opportunities in the country and by facilitating and encouraging them through different incentives and flexibilities in business operations. The development of basic industries in Nigeria will allow the manufacturers to get raw materials and spare parts within the country and a considerable amount of money will be saved that they can put to positive use, such as for research and development and skills development. The government should take necessary steps to improve the basic infrastructures such as roadways, railways and other communication systems and ensure adequate supply of energy resources to manufacturing companies so that they can work at full efficiency.

If the Nigerian manufacturing sector operators want to assure their survival in the highly competitive and technology-driven market place of today then they have to make arrangements for the adaptation of technology within their manufacturing activities and operations. The manufacturing industry is required to adopt and follow the manufacturing system and manufacturing process in accordance with the requirements of the modern system and for this they are required to do research and development work, technology adoptability as well as to focus on the training and skills development of their workers. Increments in the pay scales of the workers and incentives can also work for the betterment of the situation and the operators of the Nigerian manufacturing sector should also concentrate on this issue. In summary, Nigeria needs a stable business environment where the manufacturing companies can freely work to enhance the productivity and efficiency of their business.

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Decline of Manufacturing in Africa: China and India responsible or who else?

U M Mustapha, S Goh and H Ku

Faculty of Engineering and Surveying, University of Southern Queensland,

West Street, Toowoomba, 4350, Australia

Corresponding Author:

Title : Dr.

Name : Harry Siu-lung Ku

Affiliation : Faculty of Engineering and Surveying, University of Southern Queensland.

Tel. No. : (07) 46 31-2919

Fax. No. : (07) 4631-2526

E-mail : ku@usq.edu.au

Address: Faculty of Engineering and Surveying, University of Southern Queensland,

West Street, Toowoomba, 4350, Australia.

Abstract

The concept of globalization and world economic crisis poses great challenges to the manufacturing sector across the globe. African manufacturing sector has been significantly affected and the rapidly growing industrialized nations such as China and India have added further challenges to the African countries. The research is aimed at identifying the significant factors affecting the growth of African manufacturing sector. The main objective of the research is to identify whether China and India are responsible for the decline of manufacturing in Africa and propose some remedial measures and possible recommendations to ensure a sustainable growth in African manufacturing sector and further enhance the relationship of Africa with China and India. A literature review was conducted to identify the key factors affecting the manufacturing sector in Nigeria and Africa as a whole and also to understand the triangular relationship between Africa, China and India. To further enhance the findings and examine whether China and India plays a role in the decline of African manufacturing sector, a focus group interview was conducted identifying 10 experts from the industry. The findings of the literature review and the focus group interview revealed that inadequate infrastructures, lack of funds, non adaptability to technology, unskilled workforce, less government patronage and its policies and increasing competition from China and India are key factors affecting the growth of African manufacturing sector. The results revealed that the Africa – Asia relationship has increased the exports but targeted Africa only for resource utilization. The results also suggested and recommended that the bilateral agreements between Africa and Asia should be seriously revamped to accommodate manufacturing exports. The research concluded that though China and India poses some threats, the government needs to revamp the domestic policies and alter the trade agreements to ensure a competitive environment and benefit from the relationship.

Key Words: Manufacturing sector, exports, technology, Africa, China, India

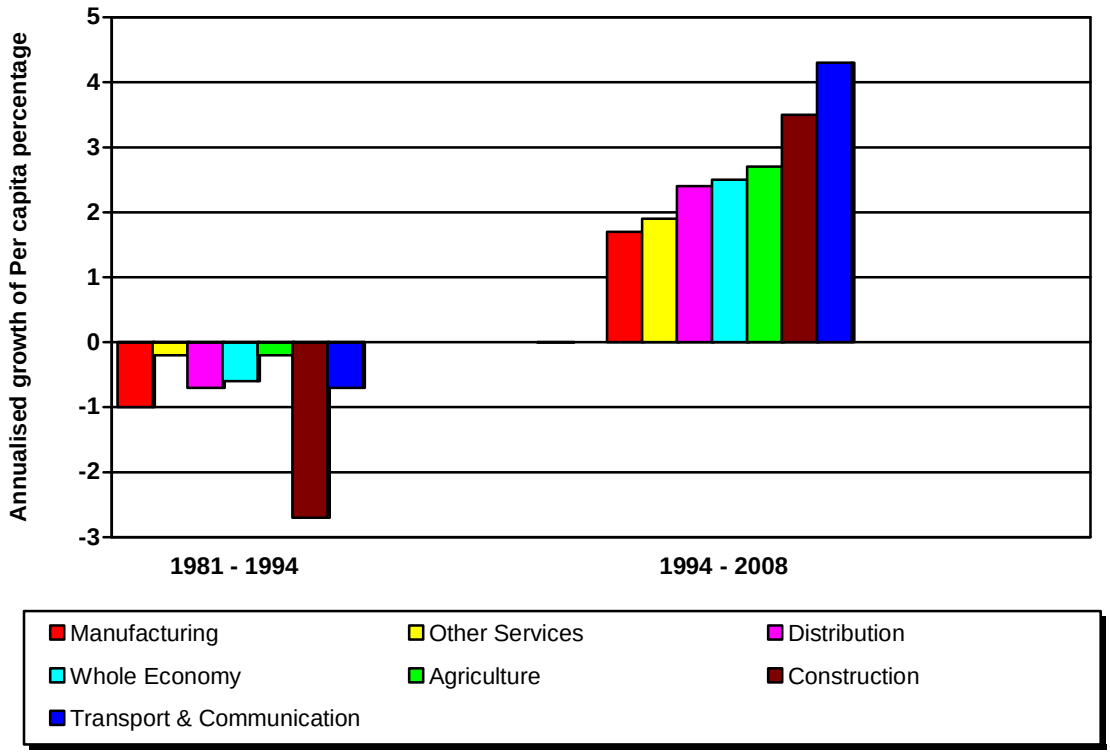
1.0 INTRODUCTION

In the past decade, manufacturing technology has expanded rapidly on a global scale. Many countries have mastered the methods, the quality processes, the execution systems and software. In this new century, the global spread of manufacturing knowledge is having far-reaching consequences. We are seeing fundamental changes in international business structures and deployment of global capital. The manufacturing sector remains significant in leading economies worldwide, but faces major issues such as cost competitiveness, product innovation and how to compete in an increasingly global market (Jim Pinto, 2005). Innovation and implementation of various concepts and strategies and rapid advancements in technology has made it imperative for the manufacturing sector to be in line with the developments and advancements in order to sustain growth and development. The global economic decline has significantly impacted the global manufacturing industry in most parts of the world. Developing countries can no longer so easily safeguard and assure their development in the globalised regime. Africa is no exception to this global phenomenon. Nevertheless, the continued rise of the emerging economies, particularly India and China, is never far from the headlines and the impact of these economies in the twenty-first century is of much debate with the possibility of a shift in global political power. This research is aimed at identifying the reasons behind the decline of manufacturing in Africa, with Nigeria as an example. The main objective of the research is to examine whether the decline in manufacturing is due to various internal factors in Nigeria or due to the invasion of some developing countries like China and India into the Nigerian manufacturing sector. The research is also aimed at proposing some remedial measures and strategies which could lead the country towards better economic growth and development. Thus, in order accomplish the objective of the paper the following research question is answered: *Is China and India responsible for the decline of manufacturing in Africa?*

2.0 MANUFACTURING IN AFRICA

With only a few exceptions, manufacturing plays a minor role in Africa's economies which is limited to small firms and simple products. The reasons behind this poor performance include uncertain macroeconomic environment, unwarranted regulations and poverty increasing the domestic demand for necessities. On a per capita basis, manufacturing in Africa declined at a rate of one percent a year between 1981 and 1994. This was the second worst performance after 0.6 per cent a year fall in GDP per capita in Africa which was during the period after construction. Between 1995 and 2008, manufacturing recovered, growing by 1.7 per cent a year on a per capita basis which still represented the worst performance. The strongest performing sectors have been construction growing at 3.5 per cent a year and the transport and communications sector at 4.3 per cent (King, 2010) .

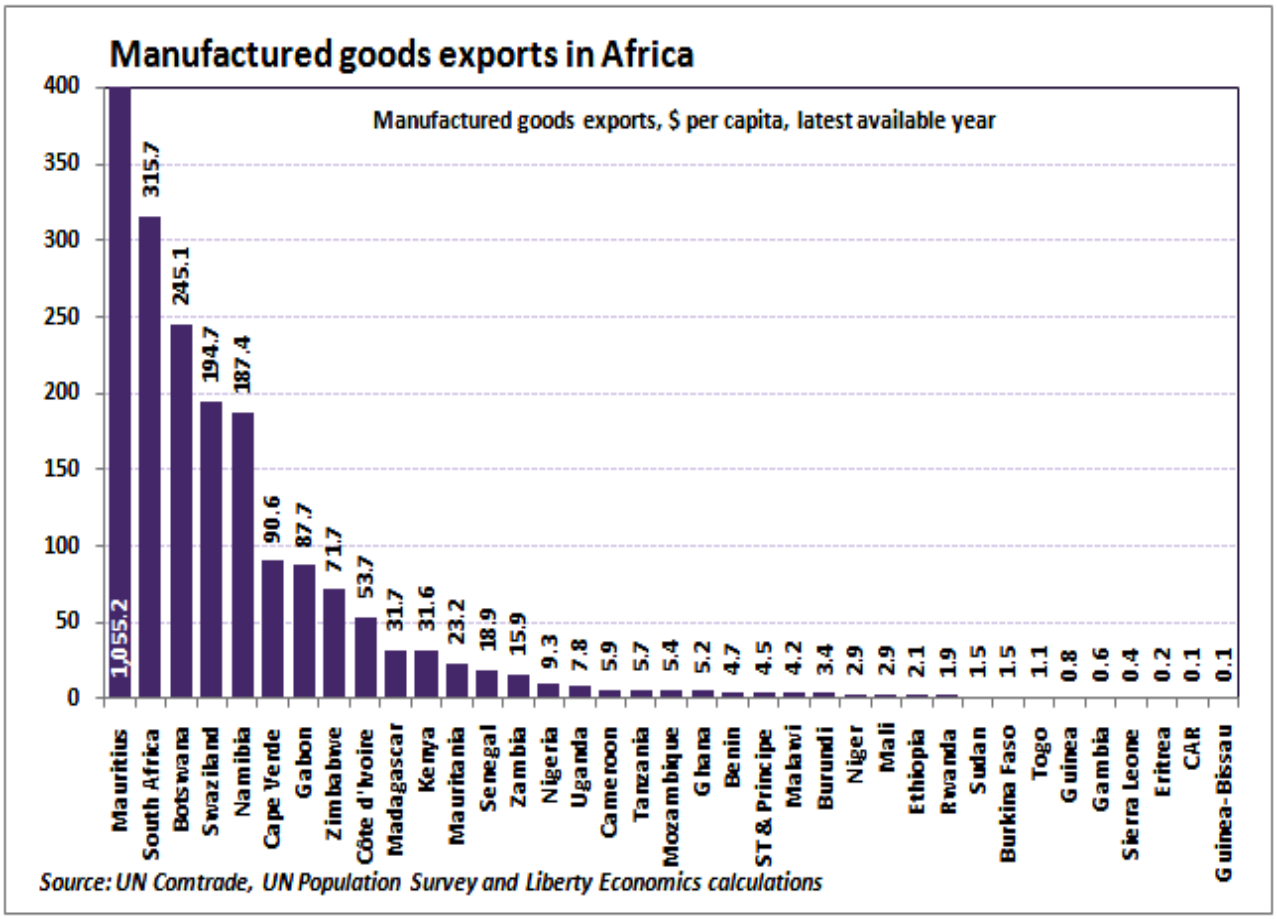
Figure 1 -Whole economy and manufacturing value-added in Africa



Source: UN National Accounts database and Liberty Economics

Africa's exports of manufactured goods have also been weak. In particular, while Sub- Saharan Africa contains around 12 per cent of the world population, its share of world manufacturing exports is less than 1 per cent. As the chart below shows, there are only five countries in Sub-Saharan Africa that exported more than $100 of manufactured goods per capita in the latest year for which data were available. These countries are Mauritius, South Africa, Botswana, Swaziland and Namibia. For most countries, the figure was below $10 per capita. There are only three countries – Mauritius, Madagascar and Cape Verde – for which manufactured goods constitute more than 30 per cent of total exports (King, 2010).

Figure 2



2.1 Comparison with Asia

Asia's integration into the world trading system in recent decades has driven a big increase in the share of Asian economies engaged in manufacturing. In line with historical precedent, this shift to manufacturing has driven large and sustained increases in per capita incomes. While Africa's economies were in absolute decline through the 1980s and early 1990s, Asia's were catching up with advanced economies and overtaking Africa. Despite the serious setback of the 1998 Asian financial crisis, rapid growth has continued and living standards have continued to improve. An important difference between the manufacturing sectors of Asia and Africa has been the ability to export into world markets. As we have already seen, only five countries in Sub- Saharan Africa export more than $100 of manufactured goods per capita. On average, the economies of Sub-Saharan Africa export just $36 of manufactured goods per capita, compared with $680 in China and $1,317 in South East Asia (2010).

Aside from the level of exports, in terms of adding value for economic development, a crucial difference between Asia and Africa is the structure of exports. In Asia, the value of manufactured goods exports exceeds that of processed commodities, which in turn is greater than that of

primary commodities. In Africa, the hierarchy runs in the opposite direction. It is the value added through processing and manufacturing that generates profit, income and jobs for the domestic economy. The only Sub-Saharan African economy where the hierarchy matches that in Asia is Mauritius, which enjoys among the highest per capita incomes in the region (King, 2010).

2.2 Benefits of Exporting

If Africa's economies are better suited to other activities, or if there are no particular benefits to manufacturing for export beyond generating foreign exchange to purchase exports, then manufacturing weakness would not be of great concern as the foreign exchange can be generated through primary commodity exports. However, economic history points to the development of manufacturing as a key driver of productivity growth, bringing significant improvements in standards of living. Recently, lot of evidence from advanced and emerging economies has built up showing that exporting companies tend to be more productive that those focused solely on the domestic market (Harrison, 1994).

Focusing on Africa specifically, a detailed study of firm-level performance in Ghana, Kenya and Zimbabwe in the early 1990s found clear evidence that exporting firms outperform non-exporters in terms of productivity and job tenure. The evidence further suggested that manufacturing in Africa can succeed in a wide variety of products. The findings revealed that the African firms within the same industry are highly heterogeneous in their ability to transform inputs into outputs which is important for firms to be able to export and compete in world markets. With this Africa will be able to export manufactured goods as trade restrictions are being abolished, provided the firms have the necessary skills. Policy measures designed to enhance such skills along with the measures taken to facilitate export may therefore be particularly rewarding in terms of improving the export performance of African manufacturing firms (Soderbom, 2000).

Over the last decade, the World Bank has conducted various firm-level surveys in Africa which provided detailed insight into the business of manufacturing in Africa. The findings of the survey revealed that macroeconomic and policy uncertainties are more important factors than lack of credit in holding back investments. It also revealed that wages are higher at larger firms but not due to higher productivity and exporting is beneficial to firms' productivity (Bigsten & Soderbom, 2005).

In an empirical study of manufacturing firms in four African countries, the Industrial Surveys in Africa (ISA) group of economic researchers examined the two possible explanations for the correlation between exporting and the productivity of firms. Firstly, exporting helps improve productivity which learning by exporting and secondly, efficient firms are able to export which is self selection (Bigsten et al, 2003). Many researchers have concluded that self selection is the stronger factor but in Africa, where domestic goods exporting markets are small and less advanced in technology, learning by exporting benefits appear significant (Biesebroeck, 2005). The research concluded that learning by exporting is possible in Africa and has much to gain from

orientating its manufacturing sector towards exporting.

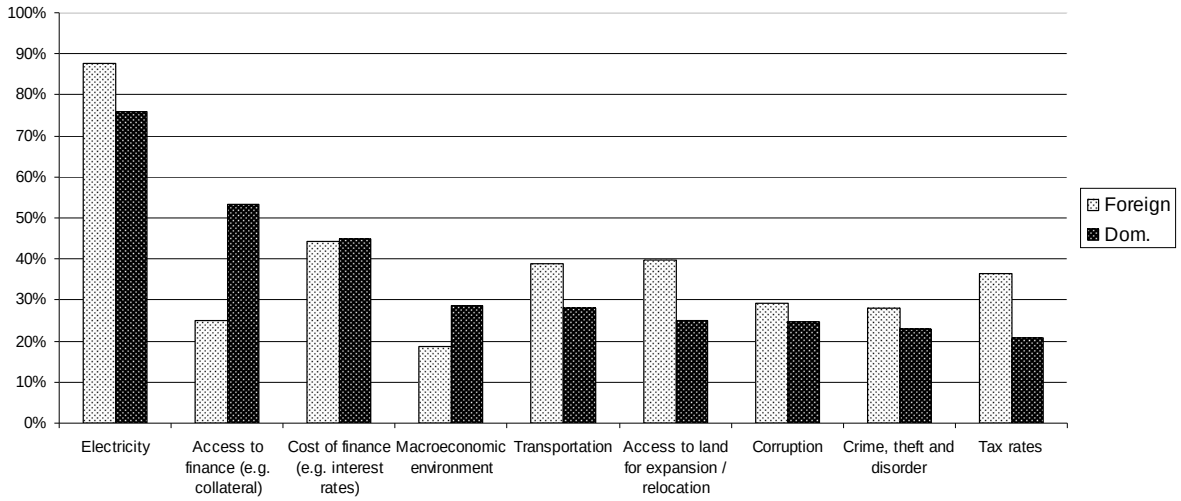
3.0 MANUFACTURING IN NIGERIA

Over the past four decades or so, the Nigerian manufacturing sector has experienced mixed fortunes. In the 1960s and early 1970s, manufacturing activities were buoyed by textile and clothing production, leather tannery, and agro-allied activities, and value added per worker was on par with, if not higher than, that in other African countries such Botswana, Ghana, and Kenya. During this period, the share of manufacturing in GDP nearly doubled from less than 5 percent to 8 percent, and on that trend many believed that Nigeria was on a path to industrialization. But at the end of the 1990s, Nigeria's manufacturing experienced a relative stagnation as manufacturing value added per capita lagged behind than that of many other countries.

The deterioration in performance of the manufacturing sector in recent years was attributed to a number of factors, including poor investment climate variables and problems associated with capacity utilization. To address the key challenges facing the manufacturing sector in particular and the industrial sector in general, the Nigerian government has since 2003 embarked upon a series of reform programs – the National Economic Empowerment and Development Strategy (NEEDS), SEEDS (at the state level) and LEEDS (at the local level). Key pillars of the reform programs include improved macroeconomic management, financial sector reform, institutional reforms, privatization and deregulation, infrastructure improvement, and efforts to combat corruption. These reform measures, aimed at creating a suitable environment for private sector participation, are being implemented to lay a solid foundation for a private sector led growth capable of creating more jobs, diversifying the economy and reducing poverty (ICA Survey).

The 2007 Investment Climate Survey project in Nigeria by the World Bank, based on firm level data collected revealed the performance of Nigerian enterprises using different measures of productivity. The results of the research revealed that electricity, access to and cost of finance, transportation and access to land are perceived to be serious constraints in Nigeria, both when looking at the percentage of firms identifying them as major or very severe constraints to business, as well as in comparison to other countries. The macroeconomic environment, corruption, crime and tax rates are perceived as less serious constraints in Nigeria when compared with other countries.

Figure 3 - Percentage of Firms Reporting Major or Very Severe Constraints (Top 9 Constraints) All Formal Sectors



Source: ICA Survey

Indirect costs of doing business in Nigeria affect different types of firms in different ways. Electricity is more of a problem for small and medium sized firms and for firms located in states with a better regulatory environment. Production lost while in transit affects large firms to a greater extent. In comparison to other countries, firms in Nigeria face higher indirect costs. Power outages result in lost production which amounts to nearly 9% of the total sale and such outages lasted approximately 8 days. Large firms and firms in the manufacturing sector are most adversely affected by such outages. Obtaining an electrical connection takes on an average 8 days irrespective of the firm size. In comparison to other countries, the percentage of firms experiencing power outages is highest in Nigeria. Clearly, the problem with electricity in Nigeria is not much related to the ability or time associated with obtaining the connection but more with the service provision itself (ICA Survey).

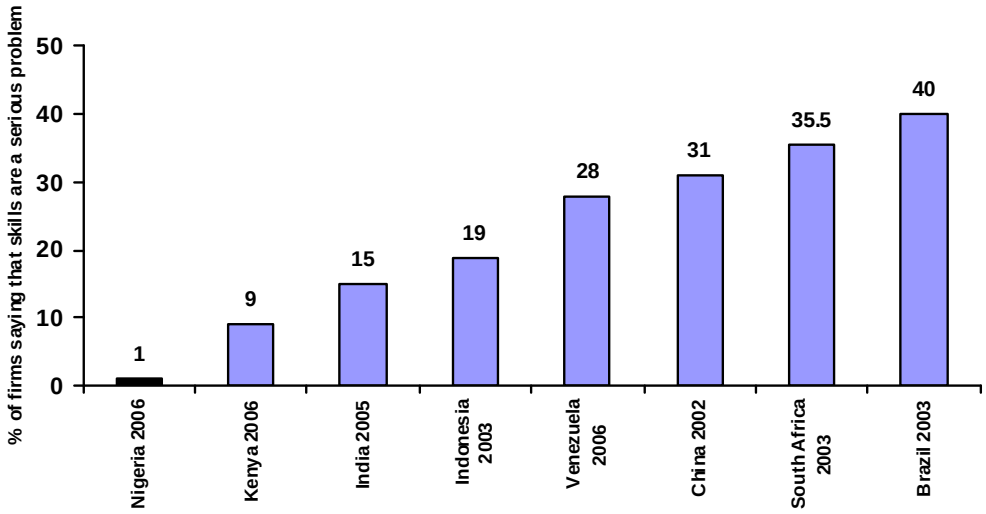
For firms in manufacturing sector, transportation problems generate indirect costs due to breakage, spoilage or theft making it the second most important indirect cost driver behind electricity. Almost 70% of the manufacturing firms in Nigeria have their inputs delivered by road and hence the firms rely on their own transport for their inputs and sales. A recent report revealed that Nigeria is ranked 93 out of 150 countries with South Africa and China topping the ranks. Moreover, Nigeria does not compare well with other countries in terms of the importing process, which include both import licensing process and the time taken to clear customs. No other country requires more documents for both importing and exporting than Nigeria. Further, Nigeria remains the most expensive location from where to ship imports or exports (ICA Survey).

All around the world, businesses tend to complain about tax levels and in Nigeria a quarter of firms identified tax rates as a significant constraint to business. However, in an international comparison, other countries have a higher percentage of firms complain about tax rates. Access to land was identified as a significant constraint to business, particularly for small firms as well

as for foreign firms. The two main reasons why land is perceived a constraint are the cost of land and the procurement process. Corruption is perceived to be a serious constraint by the manufacturing firms. Firms believe that government officials have a consistent and predictable interpretation of the law which is closely linked to corruption. These informal payments have been asked for making certain requests such as telephone or electrical connection, construction permits and operating licenses (ICA Survey).

Availability of skilled workers is also a major constraint for the manufacturing firms in Nigeria but the firms did not project it as top constraint for them. The quality of training provided to workers is also not up to the expectations as the ability of firms to impart the required skills will depend on various factors such as the extent of firm-level demand for skills development, the availability of external training by specialized firms, financial and other constraints at the firm level. In comparison to other countries, the percentage of skills shortage is a major constraint in Nigeria (ICA Survey).

Figures 4
Manufacturing Firms in Nigeria are at the bottom of the pack with regards to inadequate skills in the labor force.



Source: Investment Climate Surveys

According to Anyanwu (Central Bank of Nigeria), high productivity in the Nigerian manufacturing sector has been constrained by many factors which include the following:

Low level of technology is perhaps the greatest obstacle constraining productivity in Nigeria as

developments in technology and innovations are the primary forces propelling industrialization today. New processes and procedures of doing old things and automation have revolutionized the manufacturing industry and multiplied productivity in the industrialized nations. Unfortunately, industries in Nigeria cannot acquire modern machineries that have reduced processes. Most of them are all producing with machinery giving rise to frequent breakdown and reduction in capacity utilization rates. Low technology is responsible for the inability of local industry to produce capital goods such as raw materials, spare parts and machinery, the bulk of which are imported. Hence there is very low value added and low productivity.

Capacity utilization rate in the manufacturing sector is between 30 and 40 percent, indicating gross underutilization of resources. This has been blamed largely on frequent power outages, lack of funds to procure inputs, fallen demand for manufactures and frequent strikes and lockouts by workers and their employers. Lack of funds has made it difficult for firms to make investments in modern machines, information technology and human resources development which are critical in reducing production costs, raising productivity and improving competitiveness. Low investments have been traced largely to banks unwillingness to make credits available to manufacturers mainly because banks perceive manufacturing as a high risk venture in the Nigerian environment.

Since the introduction of SAP, high and increasing cost of production has been recorded by most business organizations as a major constraint on their operations. Increased cost is mainly due to poor performing infrastructural facilities, high interest and exchange rates and diseconomies of scale which has resulted into increased unit price of manufactures, low effective demand for goods, liquidity squeeze and fallen capacity utilization rates. Persistent increase in the general price level due to inflation constitutes a disincentive to saving for the future use and thereby retards investments and growth which also encourages speculative activities and diverts resources from productive ventures. Poor performance of infrastructural facilities, characterized by frequent disruption in electric power and water supplies and inefficient telecommunication and transportation systems, is a major constraint on productivity. As firms have to invest huge capital to provide alternative infrastructural facilities to run their businesses, enterprises are forced to carry high cost structure which reduces efficiency and results in loss of competitiveness for their products.

The manufacturing sector in Nigeria is characterized by low capacity utilization which averaged 30% in the last decade, low and declining contribution to national output which averaged 6%, declining and negative real growth rates, dominance of light assembly type consumer goods manufacture, low value-added production due to high import dependence for inputs, prevalence of unviable state-owned enterprises, accumulation of large inventories of unsold finished products and dominance of sub-standard goods which cannot compete internationally. Furthermore, the deplorable condition of the manufacturing sector was due a horde of factors such as lack of an enabling environment which included policy and polity instability, poor macro-economic environment, bureaucratic bottlenecks, poor legal environment, lack of good governance, corruption and low commitment of past governments to industrial development.

The factors included poor and inadequate infrastructure, poor implementation of incentives to manufacturers including export incentives, policy errors of the past, low access to investible funds due to underdeveloped long-term capital market that match industrial projects' needs, prevalence of obsolete technology, dearth of foreign investors and capital due to unfavorable environment, inadequate domestic demand, massive dumping of substandard products that are smuggled into Nigeria and inefficient institutional framework (Aluko, et al, 2004).

4.0 EMERGING ECONOMIES – CHINA AND INDIA

The rising profiles of the Asian giants – China and India – in global economic relations is generating considerable interests, concerns and attention at both the academic and policy levels. Their rapid growth and increased openness over the last 25 years has led to their emergence as a key player in the global economy in the early twenty-first century. China and India have been relatively closed economies with limited dependence on trade but they have been opening up, particularly so in the case of China. Trade as a percentage of GDP has been 32% in China compared to 25% in India. This should be seen against a backdrop of relatively open East and South Asian economies: Malaysia (206%), Korea (Republic) (72%), Thailand (82 %), Pakistan (36%) and Bangladesh (35%). Net flows of FDI as a % of GDP in China have been 12% in contrast to India's 0.61% (Roy, 2008).

Both countries have been growing fast over the last 25 years: China by 21 fold and India by 8 fold. The growth rate in China has been over 9% per annum making it possibly the fastest growing world economy while India's, too, has been impressive with over 8% per annum. The % living below the poverty line (1$ a day) has also been appreciably reduced in both though it is more impressive in China compared to India: 12% in the former and 26% in the latter. The major effect of China's and India's economic advance is evidenced by their contribution to global output: China's and India's share being 20% and 7% respectively in 2004. Both, moreover, have rising demand for energy, raw materials and commodities. This has a positive impact on increasing the exports of developing countries, improving their terms of trade, and initiating shifts in their pattern of trade and investment (Roy, 2008).

4.1 China, India and Africa – The Triangular Relationship

The rapidly growing Asian giants – China and India – have crafted their foreign policy goals around getting the resources needed to sustain their economic development and are on a mission to lock down sources of oil, gas and other necessary raw materials around the globe. With the high risk of instability in the Middle East, China and India are increasingly turning in the direction of Africa which has brought some opportunities as well poses some challenges to the African countries. Recent economic performance in Africa has been dampened by heavy external indebtedness. This has led to adoption of IMF and World Bank inspired structural adjustment programmes which resulted in debt relief programmes. Controversy surrounds the impact of such measures on growth and poverty reduction (Roy, 2008).

Africa's dependence on developed countries for trade and investment has weakened its

bargaining powers. It has been unable to compete with developed countries in agriculture and non agricultural markets. This has been due to a combination of forces including heavy domestic and export subsidization of agriculture and high tariffs in developed countries. The major international trade institution, the WTO, has been inefficient in establishing free and fair trade. This has adversely affected the competitive ability of African exports. However, Africa has been under pressure to open its markets to developed country exports (agricultural and non agricultural). Moreover, supply based measures, rural, infrastructural and human capital investment, are critical in enabling African countries to respond to market opportunities (Roy, 2008).

Recent findings on trade, investment and aid relationship between China, India and Africa have created much interest and hope in using the economic ties to reduce Africa's dependence on developed nations. Since 2000 there has been a massive increase in trade and investment flows between Africa and Asia. Thus, Asia today receives about 27% of African exports compared to 14% in 2000. By 2005 China had bilateral trade and investment agreements with 75% of African countries and had expressed its interest in negotiating the establishment of free trade zones with the continent. The structure of African exports to Asia emphasizes the dominance of primary and resource based goods mainly due to the growing needs of China and India to boost the industrial growth. 47% of Africa's exports to Asia comprised of oil and natural gas. Asia's exports to Africa, in turn, have also been growing at a rapid pace being over 18% per annum. China's share of African imports increased from 2.5% (1996) to 7.4% (2005). The trade ties between Africa and Asia also has important implications for Africa's terms of trade as the Asian demand for commodities has impacted on commodity prices and improved Africa's terms of trade. This favors producers but consumers could be adversely affected. China and India's growing industries and the middle class with increasing income and purchasing power could stimulate a significant increase in African exports (Roy, 2008).

Chinese FDI in Africa has been rising sharply over the last decade. The nature of investment, however, shows that much of the accumulated stock of owners and Indian FDI in Africa is concentrated in extractive sectors. Future patterns are expected to unfold significant inflows of Chinese and Indian investment in Africa in apparel, food processing, retail ventures, fisheries and seafood farming, commercial real estate, transport construction, tourism, power plants, and telecommunications. There is certainly a hope that China and India will pursue commercial strategies with Africa which will go beyond resources. Foreign aid has been channeled by China towards Africa over the last two decades which amounts to 44% of China's overall assistance to developing countries. The emergence of the triangular relationship has been supported by political forces to boost economic ties with Africa. The Indian government has also been supporting African government but has to devise a new policy which can match the economic and political might of China (Roy, 2008).

Developed nations have questioned the intensification of the China – Africa relationship because it has economic and political implications for developed nation institutions, companies and NGOs. Though Africa might benefit from increased competition for trade, investment and

even aid, the developed nations are anxious because the conditions imposed by them on Africa may get diluted. Further, this has raised a legitimate question whether China's interest in Africa is purely economic one.

5.0 RESEARCH METHODOLOGY

The review of the literature revealed the important factors behind the poor performance and decline in the Nigerian manufacturing sector. The findings also presented the relationship between the emerging Asian giants – China and India – with that of Africa. To further enhance the findings of the literature and identify whether the relationship between China and India with that of Africa is creating opportunities for Africa or reason behind the decline in manufacturing, a focus group interview was conducted. With a series of screening, 10 participants were identified for the focus group interviews, who were experts from the manufacturing industry having work experience in Nigeria as well as in other developing countries like China and India. The interview was conducted using a semi structured questionnaire which comprised of 8 questions and the participants were allowed to answer based on their experience and also comment on the views expressed by other participants. The questions covered areas like the factors affecting the growth of the African manufacturing sector, comparing the performance of Africa with Asia – specifically China and India and whether China and India are responsible for the decline of manufacturing in Africa. Further probing questions were also asked to the participants to keep the discussion in line with the topic of research.

5.1 Research Findings from the Focus Group Interview

Question 1: ***Distinguished participants, can you briefly introduce yourselves with special emphasis on your local and international manufacturing experiences as it related to identifying the reasons behind the decline in manufacturing sector?***

The participants provided their personal details and work experience in the manufacturing industry in Nigeria as well as in the international market. The real names of the participants of the focus group interview were not disclosed to maintain confidentiality and some codes were provided for identification.

Question 2: ***What factors do you think play the most important role in impeding the performance of the manufacturing sector in Africa?***

The participants of the focus group interview identified many factors impeding the performance of the African manufacturing sector. Prominent among them are inadequate infrastructure facilities such as lack of electricity, railways, roadways and telephone facilities, lack of finance facilities due to difficult borrowing conditions, lack of raw materials supply and other manufacturing inputs, usage of obsolete technology and the inability to acquire the latest and up to date technology, heavy competition due to invasion of developing countries such as China and India and low consumer demand due to preference of foreign goods leaving large volumes of manufactured goods stagnant and unsold.

Question 3: ***Based on your knowledge and experience, what are key differences do you see***

between the performances of African manufacturing sector as compared with those of China and India?

According to the participants of the focus group interview, the main difference between the African manufacturing sector and Asian giants – China and India has been the ability in exports and contributing to the economic development of the country. China's export is dominated by the manufactured goods because of which they hold a major share in the world market. Chinese manufacturing, mainly consumer goods at low cost, are dumped into African countries even, which lead to preference of foreign goods by the consumers in Africa and resulting in volumes of African manufacturing goods remain stagnant and unsold. Moreover, the macro-economic environment, government patronage through policies and regulations and flow of FDI were identified as the key differentiators between the African manufacturing sector and countries like China and India. Access to raw materials, innovation and adoption to latest technology and efficient labor force were also identified as the key differences between Africa and the manufacturing sectors of China and India.

Question 4: ***What are the key factors confronting the manufacturing firms of Nigeria?***

Lack of basic infrastructure facilities such as roadways, railways and other communication systems, lack finance and difficulties in accessing the funds, lack of advancements in technology, lack of raw materials supply and dependence overseas for the supply of the same, increased competition from countries like China and India, less government patronage and its inconsistent policies and regulations, multiple taxation and other charges, poverty and low purchasing power of the consumers, lack of efficient and skilled workforce and consumers' preference of foreign products over the locally manufactured goods were identified by the experts as the key factors confronting the manufacturing firms of Nigeria.

Question 5: ***What are the main influential factors that hinder the high quality performance and growth of the Nigerian manufacturing sector at the domestic and international level?***

The participants felt that lack of basic infrastructure facilities such as electricity, water and telecommunication systems, lack of development of basic industries leading to procurement of raw materials from overseas, non-willingness of the manufacturers in adapting to advancements in technology, lack of government support in providing favorable tariff rates for manufacturers, lack of capital due to less FDI and banks not willing to provide loans as they see manufacturing as high risk venture in Nigeria and competition from developing countries like China and India are the main influential factors that hinder the high quality performance and growth of the Nigerian manufacturing sector at the domestic and international level.

Question 6: ***Based on your knowledge and experience, to what extent the presence of China and India has influence the manufacturing sector in Africa positively?***

The rapid increase in trade and investment flows between Africa and Asia has considerably increased the African exports in primary products such as oil and metal. China's share of African

imports also increased significantly. The trade ties between Africa and Asia also has important implications for Africa's terms of trade. The demand in Asia for commodities has impacted on commodity prices and improved Africa's terms of trade. The experts felt that in the years to come, China and India's rapidly modernizing industries and the increasing middle class with rising income and purchasing power could stimulate a significant increase in African exports. They foresee a potential increase in Chinese and Indian firms investing in Africa, which indicates a change in the international division of labor. The core of the investment has been in infrastructure, transportation, telecommunications, water conservation and electricity.

Question 7: ***Based on your knowledge and experience, to what extent African manufacturing sector has been negatively influenced by the presence of China and India?***

The participants felt that China's external trade with Africa is very miniscule in spite of the bilateral relationship. They felt that Africa's exports to China is biased as the exports comprised of oil, natural gas and other leading minerals and products required by China and India to boost their industrial growth. Asian demand for commodities has impacted on prices and improved Africa's terms of trade which is favorable to producers but will affect the consumers adversely. Though the FDI inflow into Africa from China and India has increased considerably, they are concentrated in extractive sectors only. Even the foreign aid, mainly from China, is not significant as a share of overall development assistance to Africa which has limited socio-economic impact. The experts also raised questions about China's vested and strategic interest in Africa.

Question 8: ***Finally distinguished participants, what are your recommendations and suggestions that the Nigerian and African manufacturing sector has to emphasize, which will bring improvement in the overall state of the manufacturing sector?***

The experts from the focus group interview suggested that the basic infrastructure facilities such roadways, railways, supply of energy resources and communication systems should be given due importance and improved. The manufacturing companies should focus on embracing the technological advancements to compete domestically and internationally. They should also work towards equipping the workforce with proper training and skill development. The government should encourage investors to ensure inflow FDI into the manufacturing sector. The government should also develop the basic industries to ensure the procurement of raw materials by the manufacturers locally. They suggested that African countries can follow the patterns of other developing countries like China and India to ensure growth and development of manufacturing sector.

The experts insisted that Africa has to avoid being trapped as resource basket for rapidly growing industrialized countries. They suggested that Africa and Asia should work towards lifting the tariff barriers against exports. New domestic policies should be implemented to face the challenges from Asia and address the new market opportunities positively. African countries should implement consistent policies to stimulate growth and reduce poverty. The relationship between China and India should be monitored to understand their capacity to pursue

sustainable development to enhance the triangular relationship between Africa, China and India.

5.2 Discussions of the Research Findings

Manufacturing has always played a miniscule role in Africa's economic development. The findings from the literature revealed that uncertainty in the macroeconomic environment, unwarranted regulations and increase in domestic demand for necessities due to poverty as the key reasons behind the poor performance of manufacturing sector. Hence, the manufacturing sector's contribution towards GDP has also been declining. Moreover, the exports of manufacturing goods have also been very weak. The findings revealed that there is huge difference between the manufacturing sectors of Asia and Africa mainly because of the ability to export manufactured goods. The review identified that value of exports of manufactured goods are greater than that of processed and primary commodities in Asia whereas it is happening the other way in African manufacturing sector. Further, the research also emphasized the importance of manufacturing by providing evidence that exporting firms perform better than non-exporting firms in terms of productivity and job opportunities.

The findings revealed that Africa posses the potential to convert inputs into outputs which are necessary for exports. Firm level surveys conducted by World Bank revealed that macroeconomic uncertainty and inconsistent policies impeded the performance of the African manufacturing sector. Inadequate power supply, lack of financial support and high cost to access finance, lack of transportation and logistics facilities and availability of land for expansion were identified as the major constraints in the performance of the Nigerian manufacturing sector. Further, corruption and crime and tax rates were also identified as serious constraints. The research identified that indirect costs also hinder the growth in manufacturing sector. Power outages leading to lost production contributed heavily to indirect costs. Most of the manufacturing firms in Nigeria depend on transport and the problems in transportation such breakage, spoilage and theft in transit generate high indirect costs.

Nigeria is also found to be expensive for imports and exports due prolonged licensing processes and customs clearance. While tax rates are considered as lesser concern, corruption is identified as a serious concern in Nigerian manufacturing firms as there is need for informal payments for obtaining electrical or telephone connections, construction permits or operating licenses. Availability of skilled workforce is also a serious constraint for manufacturing firms. Lack of adoption to technology and non usage of modern machineries has affected the productivity in the Nigerian manufacturing sector. This has resulted in low capacity utilization and inability to produce raw materials, spare parts and machinery resulting in procurement from overseas. Lack of financial support has also affected the Nigerian manufacturing firms largely as firms are unable to invest in technology, machineries and human resources development. This is mainly because banks are not willing to lend as they see manufacturing in Nigeria as a high risk venture. Further, the introduction of SAP has resulted in increased production cost as the firms are forced to invest heavily on procuring raw materials and spare parts for the machineries from overseas.

According to the experts from the focus group interview, inadequate infrastructure facilities, lack of funds, lack of raw materials supply, low level of technology usage and mainly heavy competition from countries like China and India are the key factors that impede the performance of the manufacturing sector in Africa. The participants identified the ability to export as the key differentiator between the performances of African manufacturing sector and that of China and India. The participants felt that certainty in the environment, government support through favorable policies and regulations and financial support from FDI was also the key differentiator in the performance of these countries. Availability of raw materials, usage of technology and skilled workforce also created huge difference in the performance of Africa and countries like China and India.

The responses from the experts duly complimented the findings of the literature review in identifying the key factors confronting the manufacturing firms in Nigeria. The participants revealed that lack of infrastructure facilities, lack of supply of energy resources and raw materials, lack of adoption to technology, lack of government patronage and its inconsistent policies and tariff rates, low FDI and heavy competition from China and India were impeding the performance and growth of the Nigerian manufacturing sector at the domestic and international level. The participants were of the view that the presence of China and India considerably increased the primary products exports in Africa. The rise in exports has impacted on the commodity prices and improved the terms of trade for Africa. The participants also predicted a potential increase in investments from China and India into Africa.

At the same time, the participants felt that the Africa's exports concentrated heavily on the extractive sector. Even the inflow of FDI from China is focused on this sector. They also felt that the socio-economic impact through foreign aid from China is not significant. The participants also raised doubts on China's intensification of investments and strategic interest on Africa and hoped the interest is only economic one. The experts suggested that the government should work towards improving the infrastructure facilities. They should encourage foreign investors to ensure flow of FDI and develop the basic industries to ensure availability of raw materials locally. The manufacturers should focus on adapting to updated technology and improving the skills of workforce. They also recommended that African manufacturing sector should follow the patterns of developing countries to lead the path of growth and development. The experts felt that developing countries, particularly China and India, are targeting Africa for only resource utilization. They insisted the need for implementing domestic policies to face the challenges from Asia and exploit the new opportunities. They suggested that the China and India relationship need to be monitored to determine their capacity to pursue development and boosting the relationship of Africa with China and India.

Thus, the findings of the research identified the key factors and reasons behind the decline of manufacturing in Africa. The findings of the secondary analysis and the focus group interview identified various internal and external factors which were affecting the performance and causing the decline of the manufacturing sector in Africa for past two decades. The findings further revealed that the growth of China and India at the expense of Africa has added to

further decline in the manufacturing sector in Africa. Thus, the findings of the research addressed the main objective of this research by revealing that the performance of the manufacturing sector in Africa has been in the declining path over the last few years and the increasing presence of China and India and their exploitation of resources in Africa, has pushed down causing further decline in the manufacturing sector.

6.0 CONCLUSIONS AND RECOMMENDATIONS

African economies have been open but their unequal relationship with the world economy is prominent. Thus on the external front, the terms of trade have been falling - major dependence on commodity exports, weak inter-regional trade and dependence for trade on the developed nations, limited inflows of FDI and falling aid on the domestic front - there has been heavy reliance on agriculture, limited industrialization, extensive rural and urban poverty and unemployment. Moreover, these economic obstacles have been worsened by poor governance. African economy should seek to diversify its manufacturing sector towards export-oriented production. The initial start-up costs for businesses should be lowered by providing market information which helps in locating promising export products and markets for each country. Africa should utilize the skills and experience of managers and manufacturers from emerging markets that have proven success in the chosen product and market to increase potential exporters' cost efficiency and transferring technological knowledge. Further, Africa should continue to focus on improving infrastructure, particularly export infrastructure, improving the reliability of power and water supply, educating the workforce and implementing sound macroeconomic and regulatory policies to ensure a better business environment.

The triangular relationship between Africa, China and India poses some challenges which could be seen as possible threats and have to be resolved through economic and political dialogues between Asian and African leaders. Chinese and Indian exports could pose a threat to African exports to third country which could be overcome by making the African manufacturers more competitive. Cheap imports of Asian goods into Africa could reduce demand for African home produced goods which could stimulate pressures to increase efficiency and make African manufacturers more competitive. Rise of internationally competitive Chinese and Indian businesses may displace domestic sales as well as exports by African producers which could be rectified with protective policies to safeguard domestic industries.

China and India should not be seen as competitors but as contributors to development as sustainable growth in both can stimulate the global economy. The mounting significance of the triangular relationship between Africa, China and India has major economic implications for both Africa and Asia. The individual and combined policies of China and India have to be assessed in relation to their own domestic and external political economy. In sum, the emerging Africa – Asia relationship need fresh thinking on the political economy of globalization and the quest for development.

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